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ABSTRACT

This report presents a summary of the results of the 1988-89 Survey of Earned Doctorates conducted each year since 1958 and consisting of surveys filled out by graduates earning doctoral degrees. Organized into three sections, the report first presents a trend analysis of the numbers of doctorate recipients including data with regard to field, gender, citizenship status, race and ethnicity, time-to-degree, and post-graduation plans. A second section on financial supports examines primary sources of support (personal, university, federal or other) and indebtedness (by gender, citizenship status and race). The final section discusses the increasing participation of foreign citizens in U.S. doctoral education, with attention to numbers of such students, country of origin, field of doctorate, sources of support, postdoctoral location and plans, employment sector in the United States labor force, and work activity. Four appendixes present basic tables, trend tables, technical notes on data collection and a copy of the survey. The document contains 22 tables and 11 figures. (JB)

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Summary Report 1989

Doctorate Recipients from United States Universities

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HIGHLIGHTS

Doctorate Recipients in 1989

- In 1989, 34,319 Ph.D.s were graduated from U.S. universities, an increase of 839 since last year and the largest number ever, surpassing the previous peak of 33,755 degrees in 1973. The doctorates were distributed among the seven broad fields as follows: life sciences (6,343), education (6,265), social sciences (5,955), physical sciences (5,460), engineering (4,536), humanities (3,558), and professional/other (2,202).

- Women earned 12,510 doctoral degrees in 1989, the largest number of any year. Their 36 percent share of the cohort is a 1 percent increase over their share for the past three years. Despite gains in many fields, women continued to be underrepresented in physical sciences and engineering, accounting for 19 percent and 8 percent of 1989 Ph.D.s, respectively.

- Among U.S. citizens, whites were awarded 20,688 doctorates (90.8 percent) in 1989; blacks received 811 Ph.D.s (3.6 percent), followed by 624 Asians (2.7 percent), 569 Hispanics (2.5 percent) and 93 American Indians (0.4 percent). After a 43 percent decrease between 1979 and 1988, the number of Ph.D.s earned by U.S. black men increased by 3 percent to 323 degrees in 1989.

- In 1989, the median total elapsed time-to-degree (TTD) from year of baccalaureate to year of doctorate was 10.5 years, the same as last year. Median registered, or enrolled, time (RTD) was 6.9 years, the same as the past two years. Time-to-degree was longer for Ph.D.s in the social sciences and the nonsciences than in the natural sciences.

- Seventy-four percent of the 1989 doctorate recipients with definite postgraduation commitments planned to be employed, while 26 percent planned further study. Among new U.S. citizen and permanent resident Ph.D.s who planned to work in the United States, 51 percent found employment in academe, 21 percent in industry, 11 percent in government, and 17 percent in "other" sectors.

- Universities and personal sources provided the primary financial support during graduate school for 1989 doctorate recipients, 41 percent each. Another 11 percent of support came from the federal government, and 7 percent from "other" sources. Ph.D.s in engineering and physical and life sciences received most of their support from universities, while Ph.D.s in social sciences and the nonsciences were largely self-supporting.

- More than half of doctorate recipients in 1989 reported no educational debt upon graduation. Among Ph.D.s reporting debt, the median level owed was about $8,000. Engineers showed the lowest percentage with debt (35 percent); physical science Ph.D.s had the lowest median level of debt ($6,800). Social science doctorates, on the other hand, reported both the highest percentage with debt (62 percent) and the largest median amount owed ($11,100).

Non-U.S. Citizen Doctorate Recipients (Special Section)

- In 1989, non-U.S. citizens were awarded 26 percent of all doctoral degrees in this country (8,195 Ph.D.s), compared to 12 percent (1,176 Ph.D.s) in 1960. Most of this growth can be attributed to the surge in numbers of Ph.D.s earned by temporary residents in the past decade; in 1989, temporary residents received 6,590 degrees, or 21 percent of all Ph.D.s awarded. Asian countries were the leading suppliers of non-U.S. recipients in 1989.

- Non-U.S. citizen Ph.D.s in 1989 were most concentrated in engineering, accounting for 55 percent of all degrees in the field. They also earned 36 percent of all doctorates in physical sciences, with even larger percentages in the subfields of mathematics, physics/astronomy, and computer sciences.

- Colleges and universities provided the primary financial support during graduate school for 57 percent of non-U.S. Ph.D.s in 1989. An additional 18 percent of non-U.S. Ph.D.s obtained their main support from personal sources, 16 percent from "other" sources (12 percent from foreign governments), and 9 percent from the U.S. government.

- Of the non-U.S. citizen Ph.D.s in 1989 who reported definite postgraduation commitments, 63 percent expected to remain in the United States at least temporarily, compared to 51 percent in 1973. Temporary residents with U.S. commitments were somewhat more inclined to continue their education, while permanent residents were more likely to be employed.

- In 1989, at least 60 percent of both permanent and temporary resident Ph.D.s who planned to stay in the United States reported employment commitments in academe, and more than 30 percent of each group reported commitments in industry. The majority of non-U.S. Ph.D.s in all fields but engineering planned to work in academe; engineers were more likely to work in industry.

- The majority of U.S.-employed temporary resident Ph.D.s in 1989 planned to perform research and development (R&D), while permanent residents were almost evenly divided between R&D and teaching. R&D was the most frequently reported activity in the industrial sector. Teaching was most often reported in academe, although R&D was also indicated by a significant number of non-U.S. Ph.D.s in that sector.

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USER COMMENTS

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Summary Report 1989

Doctorate Recipients from United States Universities

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NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The survey project is part of the program of the Office of Scientific and Engineering Personnel (OSEP).

This report has been reviewed by a group of persons other than the author according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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This report is based on research conducted by OSEP with the support of the National Science Foundation (NSF), the National Institutes of Health (NIH), the National Endowment for the Humanities (NEH), the U.S. Department of Education (U.S. Dept. of Ed.), and the U.S. Department of Agriculture (USDA) under NSF Contract No. SRS-8517008. Opinions, findings, conclusions, or recommendations expressed in this publication are those of OSEP and do not necessarily reflect the views of the sponsoring agencies.

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PREFACE AND ACKNOWLEDGMENTS

This report presents a summary of the results of the 1988-89 Survey of Earned Doctorates (SED), which has been conducted each year since 1958 by the National Research Council's Office of Scientific and Engineering Personnel (OSEP) and its predecessor organizations. Questionnaires, distributed with the cooperation of the graduate deans of U.S. universities, are filled in by graduates as they complete requirements for their doctoral degrees. The doctorates are reported by academic year (from July 1 of one year through June 30 of the following year) and include research and applied-research doctorates in all fields. Professional degrees such as the M.D., D.D.S., O.D., D.V.M., and J.D. are not covered by this survey. A full list of included degrees can be found inside the back cover. For convenience throughout this report, "Ph.D." is used to represent any of the doctoral degrees covered by the survey.

This *Summary Report* is the twenty-third in an annual series of reports that began in 1967. Trend data from earlier periods can be found in the book *A Century of Doctorates: Data Analyses of Growth and Change* (National Academy of Sciences, 1978). All survey responses become part of the Doctorate Records File (DRF), a virtually complete data bank on doctorate recipients from 1920 to 1989. More than 85 percent of the 950,964 records now in the DRF have come from results of the 1958-1989 surveys. For doctorates granted during the 1920-1957 period, information was compiled from commencement bulletins, registrars' records, and other published material.

The conduct of the SED, the maintenance of the resulting data file, and the publication of this report are funded jointly by the National Science Foundation (NSF), the National Institutes of Health (NIH), the National Endowment for the Humanities (NEH), the U.S. Department of Education (U.S. Dept. of Ed.), and the U.S. Department of Agriculture (USDA). Susan Hill (NSF) serves as the project officer for the agencies and her counsel is appreciated. In addition, constructive reviews of the design and analysis of the survey by Mary Golladay (NSF), Paul Seder (NIH), Jeffrey Thomas (NEH), Linda Zimbler (U.S. Dept. of Ed.), and K. Jane Coulter (USDA) increased the survey's relevance to national policy issues. We also express deep appreciation to the graduate deans in the doctorate-granting institutions for their continuing interest in and assistance to this project. It is through their cooperation that the DRF continues to serve as a useful resource for monitoring developments in graduate education in the country.

The 1988-1989 Survey of Earned Doctorates was conducted under the able administrative supervision of Joanne M. Weinman, who together with Delores H. Thurgood, analyzed survey results and prepared this report. Andrew Flannery produced most of the graphics, verified the accuracy of the numbers, and finalized the manuscript format for publication. George Orvis reviewed the report, also verified the accuracy of the numbers, and assisted in the production of the graphics and appendix tables. Martha Bohman prepared all appendix tables for the publication. Special appreciation is also expressed to the following people: Eileen Milner, who supervised the coding and editing of the data, and her staff who provided proficient support in the collection and processing of the survey: Walter Fox, Abraham Gedamu, John Hines, and Mary Wanyoike; thanks are

also expressed to George Boyce, manager of OSEP's Data Processing Section; Joseph Finan and Maren Herman, who were responsible for the computer programming and processing; and Linda S. Dix, OSEP's reports officer, who edited the report.

The work of this project was overseen by the Advisory Committee for Studies and Analysis of the Office of Scientific and Engineering Personnel, which is concerned with those activities of the National Research Council that contribute to the effective development and utilization of the nation's scholars and research personnel. During the development of this report, Alan E. Fechter, executive director of OSEP, provided helpful guidance as did Michael G. Finn, who served as OSEP's Director of Studies and Surveys through June 1990, and Pamela Ebert Flattau, who succeeded him in that position. Suggestions for improvement of the content or format of the report, other comments, and questions are welcome and may be directed to the project manager, Joanne M. Weinman.

William D. Carey, Chairman
Office of Scientific and Engineering Personnel
Advisory Committee on Studies and Analyses

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INTRODUCTION

In academic year 1989 (July 1, 1988-June 30, 1989), 34,319 Ph.D.s were graduated from U.S. universities,[1] 3,080 degrees more than 1979 and 839 more than in 1988. The number in 1989 surpassed the peak of 33,755 recipients in 1973. However, while the sizes of the classes were comparable, the characteristics of the doctorates were quite different. For instance in 1989, there were 6,425 more women and 3,023 more foreign citizens (mostly temporary residents) than 16 years ago. In addition, Ph.D.s took longer to earn their degrees: total elapsed time from baccalaureate to doctorate increased from a median 8.4 years in 1973 to 10.5 years in 1989; and registered, or enrolled, time grew from 5.8 years to 6.9 years. The median age of recipients was 2.5 years older in 1989.

Selected statistics from the 1988-89 Survey of Earned Doctorates (SED) are presented in this report, along with trend data from the comprehensive Doctorate Records File. The body of the report discusses highlights of these data. Supplementary tables on 1989 doctorates are displayed in Appendix A, and trend data are displayed in Appendix B. Technical notes are in Appendix C, and the survey questionnaire is included in Appendix D.

Recent *Summary Reports* have included special sections that analyze important trends in the survey results. This year's special section focuses on the non-U.S. citizen doctorate recipients and their growth since 1960, discussing their countries of origin; the fields in which they earned their Ph.D.; their primary sources of support in graduate school; and their postgraduation plans, with a focus on those individuals planning to work at least temporarily in the United States after graduation.

Seven broad fields are profiled in the text of *Summary Reports*. Readers should note that these fields may differ from those reported by federal sponsors of the survey. For a list of subfields that make up each broad field, see the inside back cover of this report and the specialties list in Appendix D. Data on fine fields of Ph.D.s are included in the Appendix Tables.[2]

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[1]Responses were received from 31,373, or 91.4 percent, of the 34,319 persons who earned doctorates in academic year 1989. When individuals did not complete the questionnaire, abbreviated records were compiled using information from the universities' commencement bulletins. As a result, basic information—such as gender, field, institution, and year of Ph.D.—is available for all of the 34,319 doctorate recipients. See Technical Notes in Appendix C for questionnaire item nonresponse rates.

[2]Additional information on doctorates in science and engineering fields is available from the National Science Foundation, a sponsor of the SED. Please contact the project officer, Susan Hill, for further information (202) 634-4787.

TREND ANALYSIS OF THE NUMBER OF DOCTORATE RECIPIENTS

In academic year 1989, U.S. colleges and universities awarded the largest number of doctorates ever, 34,319. About 87 percent of these degrees were Ph.D.s or D.Sc.s; 10 percent were Ed.D.s; and the remainder were other specialized doctorates. (See the inside back cover of this report for a complete list of degrees included in the survey.)

For the fourth consecutive year, the number of students earning doctoral degrees increased. This rise has occurred after a plateau that characterized the first half of the 1980s: the number of Ph.D.s rose dramatically in the 1960s, peaking at 33,755 in 1973 (see Figure 1 and Table 1). A decline then occurred through 1978, after which the number of Ph.D.s stabilized around 31,200 annually through 1985. Since 1986, the number of doctorates awarded annually has continued to grow, surpassing the 1973 peak in 1989.

Although the number of doctorates more than tripled between 1960 and 1989, not all groups of recipients increased proportionately. For example, the number of women increased more than twelvefold, from 1,042 recipients in 1960 to 12,510 in 1989. The number of non-U.S. citizens increased nearly sevenfold, from 1,176 in 1960 to 8,195 in 1989, the largest number and highest proportion of any year.

NOTE: See Table 1.

FIGURE 1 Doctorates awarded by U.S. colleges and universities, 1960-1989.

TABLE 1 Doctorates Awarded by U.S. Colleges and Universities, 1960-1989

Year	Number	Year	Number	Year	Number	Year	Number
1960	9,733	1968	22,936	1976	32,946	1984	31,337
1961	10,413	1969	25,743	1977	31,716	1985	31,297
1962	11,500	1970	29,498	1978	30,875	1986	31,895
1963	12,728	1971	31,867	1979	31,239	1987	32,356
1964	14,325	1972	33,041	1980	31,020	1988	33,480
1965	16,340	1973*	33,755	1981	31,357	1989	34,319
1966	17,949	1974	33,047	1982	31,111		
1967	20,403	1975	32,951	1983	31,282		

*Prior to 1989, 1973 was the peak year for doctorates earned in the United States.

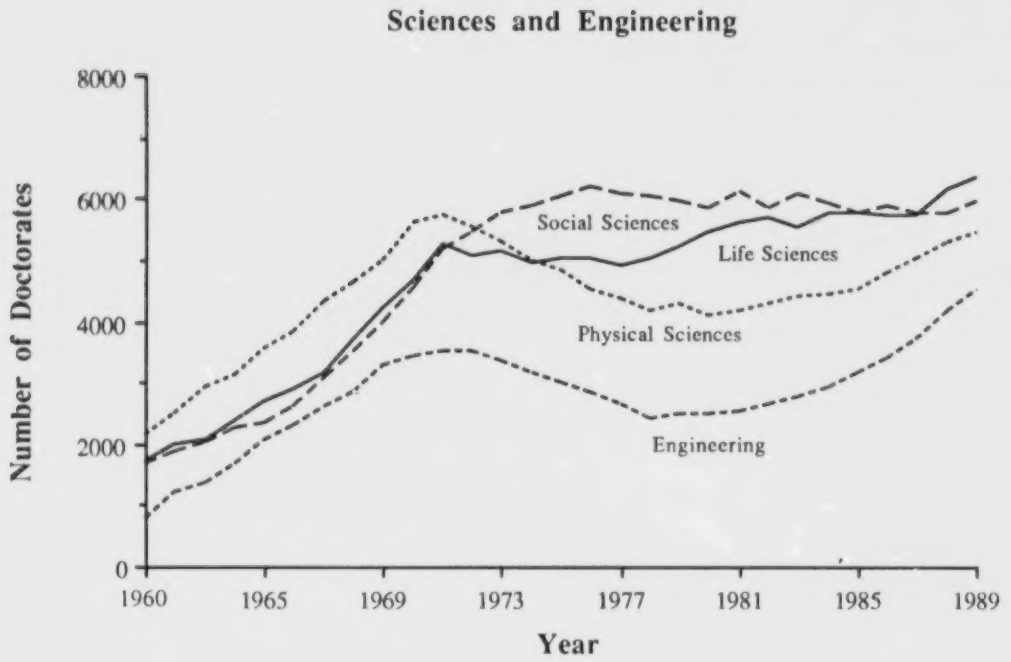
Field of Doctorate

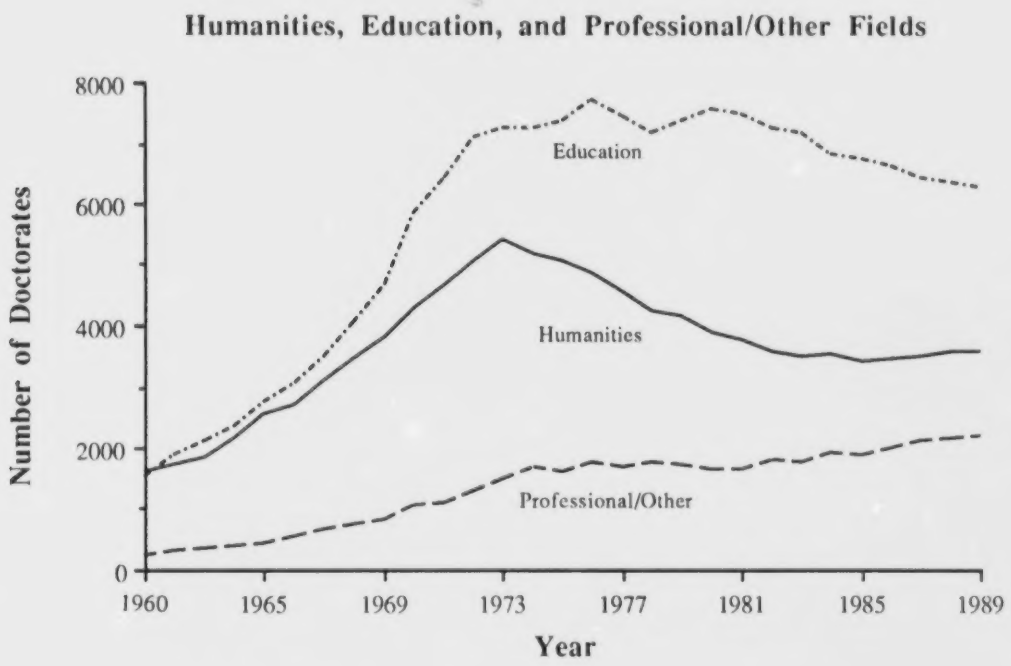
Different rates of change were also evidenced within the various doctorate fields. Figure 2 shows the trend in doctorate production from 1960 to 1989 for each of the seven broad fields. The pattern that emerges from disaggregation of fields is different in 1989 and 1973. For instance, in 1989 the broad fields of engineering and life sciences[3] showed proportionate increases of 3.2 percentage points each, growing from 10.0 percent and 15.3 percent, respectively, since 1973. The growth in engineering degrees was most notable in the fields of chemical and mechanical (includes engineering mechanics) engineering. The number of Ph.D.s earned in each of these fields declined somewhat after 1973, when 408 and 541 degrees were awarded, respectively. However, the number of doctorates in these fields has increased fairly steadily over the last decade, largely because of growth in the number of foreign citizens who received degrees in these fields. (See the special section of this report on field of doctorate starting on page 38 for more discussion of this topic. Numbers used in this discussion can be found in Appendix Table B-1.) In 1989, the number of new Ph.D.s in chemical engineering was 624, and in mechanical engineering 757 Ph.D.s were awarded—increases of 53 percent and 40 percent, respectively, since 1979.

Between 1973 and 1989, the number of Ph.D.s awarded in life sciences as a whole increased by 23 percent (from 5,167 to 6,343 Ph.D.s). However, while biological and agricultural sciences both grew modestly over the period (13 percent and 21 percent, respectively), health sciences more than doubled, increasing from 486 to 985 Ph.D.s between 1973 and 1989. Moreover, health science degrees constituted 16 percent of all life sciences doctorates in 1989, compared to 9 percent in 1973, because of an upsurge in the field of nursing, which accounted for more than 60 percent of the growth in health sciences over the last decade. Between 1979 and 1989, the number of doctorates in nursing rose from 53 to 314, nearly doubling in the last five years alone.[4] (See Appendix Table B-1.)

[3]"Life sciences" is an umbrella term that covers the biological, agricultural, and health sciences.

[4]Data on nursing are not available for earlier years.





NOTE: See Table 3.

FIGURE 2 Doctorate recipients, by broad field, 1960-1989.

Professional/other fields[5] also showed a small proportionate increase of just under 2 points, growing from 4.5 percent in 1973 to 6.4 percent in 1989. This was the one broad area that grew in most years, steadily climbing upward from 1,503 recipients to 2,202 in 1989. The fields of physical sciences and social sciences accounted for about the same proportions of doctorates in both 1973 and 1989 (16 percent and 17 percent, respectively). However, the number of physical sciences doctorates awarded each year declined in the interim years but has since recovered. (In 1973 the number of Ph.D.s awarded in the physical sciences was 5,311 and in 1989 5,460.) In contrast, social sciences rose in the interim to a high of 6,142, but has now fallen off although not to its 1973 level.

The fields of education and humanities have decreased since 1973. After growing somewhat during intervening years, education has now fallen 13 percent below its 1973 level, to 6,265 in 1989. Humanities exhibited a downward trend in proportionate shares throughout the period, falling from 16 percent of all doctorates in 1973 to 10 percent in 1989. Humanities and social sciences have not shown the recovery that physical sciences and engineering have, but unlike education, their decline does seem to have stemmed. The number of humanities doctorates peaked at 5,414 in 1973; in 1989, there were 3,558, a number that has been relatively stable for the last 8 years.

The characteristics of recipients in the various fields have changed since 1973. In 1973, about 79 percent of new physical science doctorates and 65 percent of new engineering doctorates were U.S. citizens. In 1989, the U.S. percentages were about 64 and 45, respectively. The number of specialists within these fields also changed. For example, within physical sciences, the number of mathematics Ph.D.s fell from 1,232 recipients in 1973 to 861 Ph.D.s this year, a decrease of 30 percent. The 1989 number, however, is the greatest since 1977. U.S. citizens accounted for the majority (51 percent) of the mathematics doctorates in 1989 after a two-year period when the majority were awarded to non-U.S. citizens (51 percent in each year).

Another change in the overall characteristics of the recipients was their sex. Women significantly increased their proportion among life sciences doctorates, from 18 percent in 1973 to 38 percent in 1989. Women also increased their presence in professional/other fields: in 1973 women represented 13 percent of the recipients; in 1989 they received 35 percent of the doctorates. Most of this growth in the number of professional degrees awarded to women has been in business and management, although the numbers in communications and social work have also risen significantly.

Gender

In 1989, 21,809 men earned the Ph.D. in the United States, the largest number of men to receive it in a decade. The number of men earning the doctorate began a 13-year decrease in 1973; since 1986, however, men increased their doctorate production each year (see Table 2). In comparison, women increased both their number and proportion of doctorates in every year from inception of the SED (1958) through 1986, after which their number continued to grow (reaching 12,510 in 1989) but their proportion stayed at about 35 percent until 1989, when women earned 36 percent of all degrees. As shown in Figure 3, since 1960, women have experienced significant gains in fields in which they

[5]Professional/other fields includes business and management, other professional fields, and other fields as specified in the specialties list in Appendix D, page 109 of this report.

TABLE 2 Gender of Doctorate Recipients, by Broad Field, 1973 and 1979-1989

Gender	1973*	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Total All Fields	33,755	31,239	31,020	31,357	31,111	31,282	31,337	31,297	31,895	32,356	33,480	34,319
Men	27,670	22,302	21,613	21,465	21,018	20,749	20,638	20,552	20,591	20,931	21,668	21,809
Women	6,085	8,937	9,407	9,892	10,093	10,533	10,699	10,745	11,304	11,425	11,812	12,510
Physical Sciences†	5,311	4,299	4,111	4,170	4,291	4,426	4,452	4,531	4,807	5,030	5,310	5,460
Men	4,929	3,803	3,609	3,667	3,715	3,809	3,795	3,817	4,033	4,200	4,431	4,434
Women	382	496	502	503	576	617	657	714	774	830	879	1,026
Engineering	3,364	2,490	2,479	2,528	2,646	2,781	2,913	3,166	3,376	3,711	4,189	4,536
Men	3,318	2,428	2,389	2,429	2,522	2,657	2,762	2,968	3,151	3,469	3,903	4,163
Women	46	62	90	99	124	124	151	198	225	242	286	373
Life Sciences	5,167	5,223	5,461	5,611	5,709	5,553	5,757	5,779	5,733	5,748	6,154	6,343
Men	4,245	3,952	4,047	4,076	4,073	3,832	3,964	3,909	3,785	3,719	3,884	3,917
Women	922	1,271	1,414	1,535	1,636	1,721	1,793	1,870	1,948	2,029	2,270	2,426
Social Sciences	5,758	5,961	5,856	6,142	5,837	6,096	5,930	5,765	5,892	5,789	5,773	5,955
Men	4,547	3,969	3,811	3,945	3,679	3,690	3,504	3,388	3,381	3,297	3,175	3,263
Women	1,211	1,992	2,045	2,197	2,158	2,406	2,426	2,377	2,511	2,492	2,598	2,692
Humanities	5,414	4,141	3,871	3,751	3,561	3,500	3,536	3,429	3,460	3,500	3,555	3,558
Men	3,864	2,549	2,339	2,203	2,051	1,969	1,947	1,940	1,896	1,929	1,980	1,940
Women	1,550	1,592	1,532	1,548	1,510	1,531	1,589	1,489	1,564	1,571	1,575	1,618
Education	7,238	7,385	7,586	7,497	7,251	7,174	6,808	6,733	6,645	6,449	6,357	6,265
Men	5,455	4,277	4,203	3,957	3,712	3,555	3,337	3,242	3,034	2,896	2,845	2,660
Women	1,783	3,108	3,383	3,540	3,539	3,619	3,471	3,491	3,611	3,553	3,512	3,605
Professional/Other	1,503	1,740	1,656	1,658	1,816	1,752	1,941	1,894	1,982	2,129	2,142	2,202
Men	1,312	1,324	1,215	1,188	1,266	1,237	1,329	1,288	1,311	1,421	1,450	1,432
Women	191	416	441	470	550	515	612	606	671	708	692	770

*Prior to 1989, 1973 was the peak year for doctorates earned in the United States.
†Includes mathematics and computer sciences.

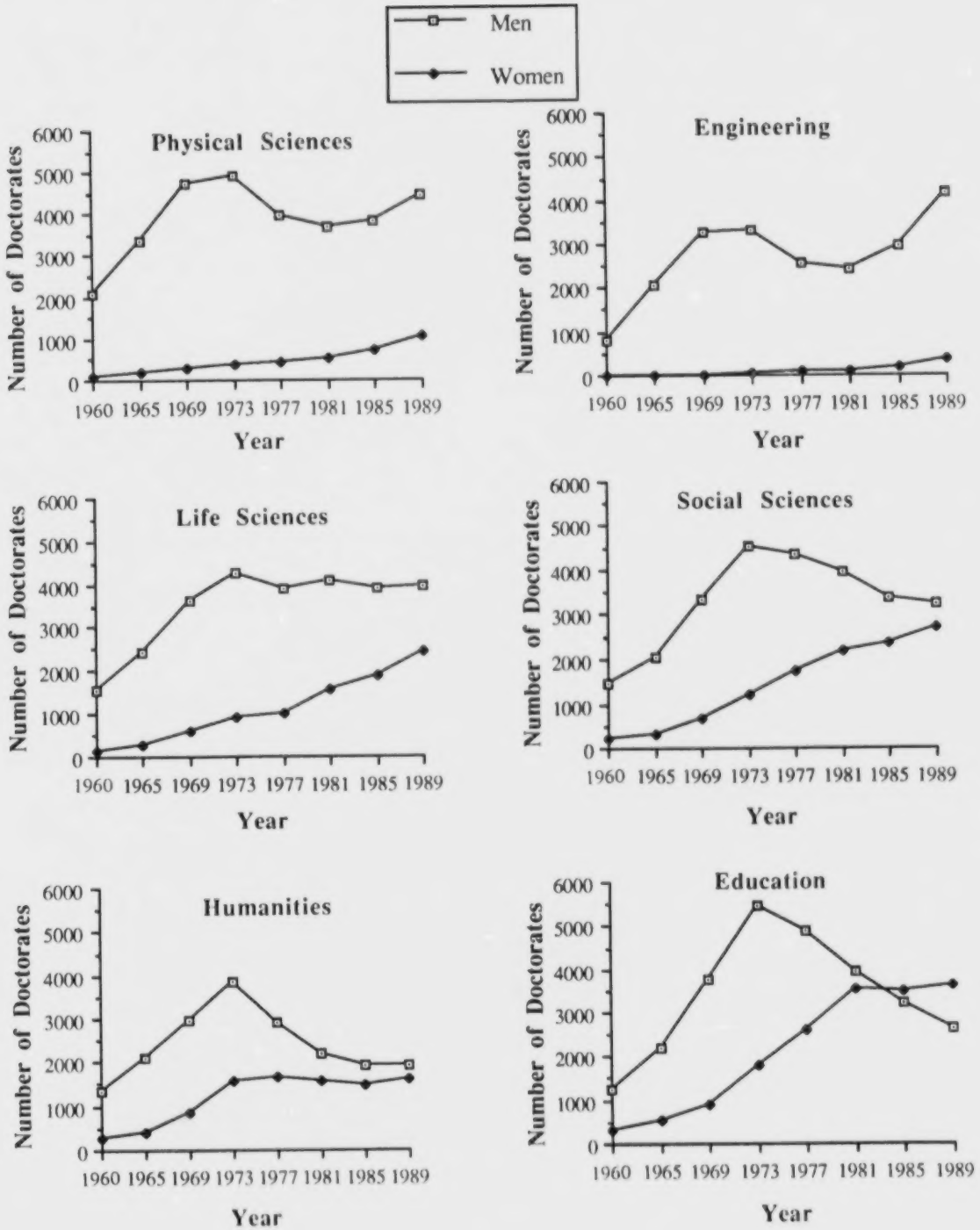


FIGURE 3 Doctorate recipients, by gender and broad field, 1960-1989.

have been typically underrepresented—such as physical sciences, life sciences, and engineering—and more moderate growth in social sciences and professional/other fields. In humanities and education, the number of doctorates earned by women has remained relatively stable since 1984. Among men, the number of Ph.D.s in the fields of physical sciences, engineering, and life sciences began falling in 1973 after peaking one year earlier. The decrease in these fields paralleled the decline in the total number of men who received doctorates. Initially, there were dramatic declines in the number of male Ph.D.s in physical sciences and engineering that continued into the early 1980s, but in 1983 the number of men in these fields began to increase. While the number of male Ph.D.s in physical sciences remains well below the peak in 1972, the number of male Ph.D.s in engineering has surpassed the 1972 peak. The number of men who received Ph.D.s in life sciences showed a more moderate decline and, with some fluctuation, has been relatively stable over the last 16 years. Decreases also occurred in the number of men receiving doctorates in humanities and education; however, while the number in humanities stabilized over the last six years, the number in education decreased further. The decline in the number of men who received degrees in social sciences and professional/other fields began later, in 1977. Social sciences has continued its downward trend, but professional/other fields has recovered and grown in the last four years.

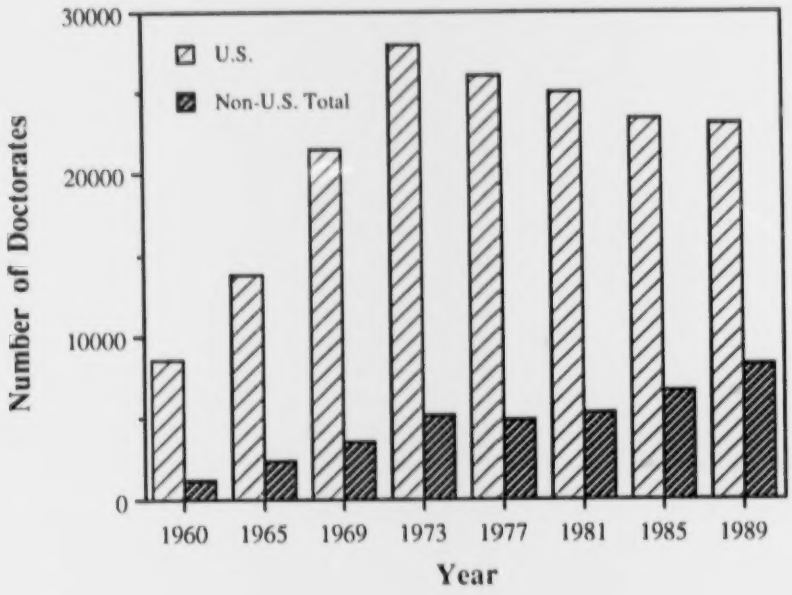
It is evident from both Table 2 and Figure 3 that the gender gap has narrowed in all fields, in some cases because women increased their numbers dramatically, and in others because the number of men decreased while the number of women grew. Nevertheless, disparities between the sexes remain marked in certain disciplines (see Appendix Table A-3). The data indicate that, despite numerical gains, women are still underrepresented in physical sciences and engineering (81 percent male versus 19 percent female in physical sciences, and 92 percent male versus 8 percent female in engineering). In life sciences, women earned 38 percent of all doctorates in 1989, although they outnumbered men in the subfield of health sciences, where they constituted 65 percent of Ph.D.s. This proportion was largely the result of the number of women earning Ph.D.s in nursing, a traditionally female-dominated area; 48 percent of health science Ph.D.s awarded to women were in nursing. (See Appendix Table A-1, for numbers in each specialty.)

In both social sciences and humanities, on the other hand, the gap between the numbers of men and women receiving doctorates narrowed considerably. While in 1960 women received only 13 percent of all social science doctorates, 45 percent of 5,955 such doctorates in 1989 were awarded to women. This trend toward equality, however, masks differences among some social science fields: in 1989, women dominated in psychology (56 percent); but in economics and political science/ international relations, men led with 81 percent and 74 percent, respectively, and in other social sciences, men held a 63 percent share. In 1989, 46 percent of humanities Ph.D.s were awarded to women, compared to 16 percent in 1960. Women were more numerous in English (58 percent) and foreign languages and literature (61 percent), while men predominated in history (66 percent) and other humanities (60 percent).

Education was the only broad field in 1989 where women—earning 58 percent of the doctorates—were more numerous than men. This continued a trend begun in the early 1970s: the number of male education doctorates dropped from 5,455 in 1973 to less than 2,660 in 1989, and the number of women rose from 1,783 to just over 3,605. In 1989 as in the two previous years, however, the number of degrees earned in this field decreased for both men and women.

Citizenship Status

The proportion of doctorates earned by U.S. citizens has steadily decreased through the years especially during the last decade (see Figure 4). In 1960, 88 percent (8,469) of doctorates (whose citizenship was known) were granted to U.S. citizens and 12 percent (1,176) to non-U.S. citizens. By 1989, the U.S. percentage was 74 percent (23,172), and the non-U.S. percentage had grown to 26 percent (8,195). Foreign participation in the doctoral pool is discussed more fully in the special section of this report, beginning on page 31. Table 3 displays percentages of U.S. versus non-U.S. citizens for the seven broad fields. Although the number of doctorates granted to U.S. citizens increased in each of the fields between 1960 and 1989, the U.S. share of degrees decreased in every field. This was most evident in engineering, where the U.S. percentage dropped more than 30 points from 77 percent in 1960 (607 Ph.D.s) to 44 percent in 1989 (1,809 Ph.D.s). However, U.S. citizens experienced significant decreases in physical sciences as well (a decline of 23 points), but life and social sciences decreases were less significant: 6 points and 8 points respectively. Since 1960, the proportion of U.S. citizens in humanities declined 11 points including a sharp 4-point drop during the most recent 5-year interval, 1985-89. Professional/other fields, dropping 15 points over the 1960-1989 period, showed more of a decline than humanities. In contrast, the proportion of U.S citizens remained relatively the same in education for the 30-year period, declining 5 points.



NOTE: See Table 3 and Technical Notes in Appendix C for rates of nonresponse to the question on citizenship status.

FIGURE 4 Citizenship composition of doctoral cohorts, 1960-1989.

TABLE 3 Citizenship Status of Doctorate Recipients, by Broad Field for Selected Years, 1960-1989 (in percent)

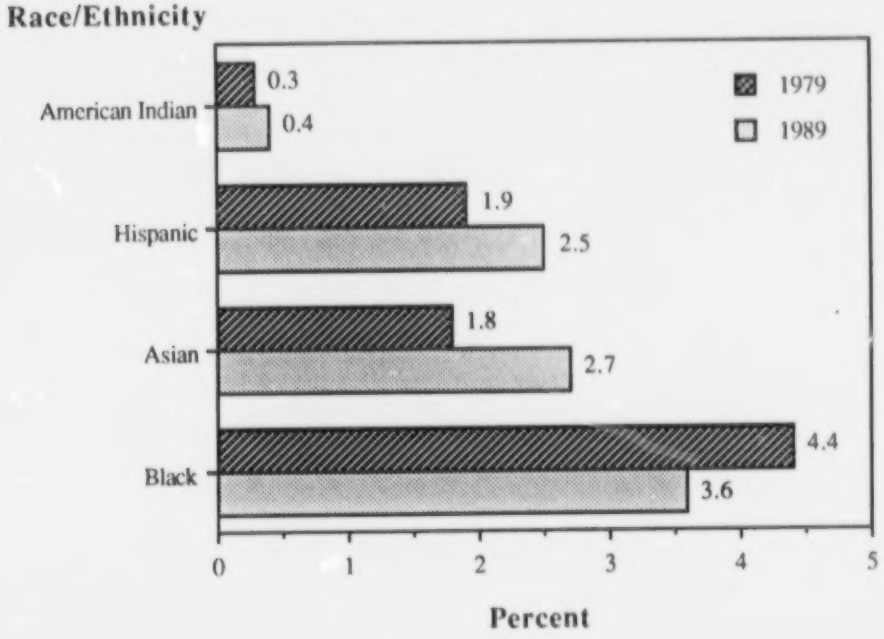
Field/ Citizenship	1960	1965	1969	1973*	1977	1981	1985	1989
Total All Fields† (No.)	9,733	16,340	25,743	33,755	31,716	31,357	31,297	34,319
U.S. Citizens	87.8	85.6	85.8	84.4	84.4	82.8	78.1	73.9
Non-U.S. Citizens	12.2	14.4	14.2	15.6	15.6	17.2	21.9	26.1
Physical Sciences§ (No.)	2,152	3,550	5,005	5,311	4,379	4,170	4,531	5,460
U.S. Citizens	86.7	84.9	84.1	78.6	78.0	75.9	70.1	64.2
Non-U.S. Citizens	13.3	15.1	15.9	21.4	22.0	24.1	29.9	35.8
Engineering (No.)	794	2,074	3,265	3,364	2,643	2,528	3,166	4,536
U.S. Citizens	76.8	77.5	74.7	64.5	57.3	48.5	42.4	44.8
Non-U.S. Citizens	23.2	22.5	25.3	35.5	42.7	51.5	57.6	55.2
Life Sciences (No.)	1,729	2,684	4,204	5,167	4,920	5,611	5,779	6,343
U.S. Citizens	81.9	77.2	80.3	80.0	81.0	82.9	80.0	76.3
Non-U.S. Citizens	18.1	22.8	19.7	20.0	19.0	17.1	20.0	23.7
Social Sciences (No.)	1,668	2,327	3,984	5,758	6,073	6,142	5,765	5,955
U.S. Citizens	88.0	86.3	87.5	86.6	87.6	87.6	83.9	80.2
Non-U.S. Citizens	12.0	13.7	12.5	13.4	12.4	12.4	16.1	19.8
Humanities (No.)	1,600	2,530	3,788	5,414	4,562	3,751	3,429	3,558
U.S. Citizens	94.0	92.3	91.7	90.9	91.5	89.3	87.4	83.2
Non-U.S. Citizens	6.0	7.7	8.3	9.1	8.5	10.7	12.6	16.8
Education (No.)	1,549	2,736	4,659	7,238	7,455	7,497	6,733	6,265
U.S. Citizens	94.8	94.6	94.2	94.5	93.3	90.8	89.2	89.6
Non-U.S. Citizens	5.2	5.4	5.8	5.5	6.7	9.2	10.8	10.4
Professional/Other (No.)	241	439	838	1,503	1,684	1,658	1,894	2,202
U.S. Citizens	89.0	83.4	85.8	83.8	83.9	82.2	76.7	73.9
Non-U.S. Citizens	11.0	16.6	14.2	16.2	16.1	17.8	23.3	26.1

NOTE: Totals in each field include doctorates with unknown citizenship status. Percentages are based on the number who reported citizenship status. See Technical Notes in Appendix C for rates of nonresponse to this question.

*Prior to 1989, 1973 was the peak year for doctorates earned in the United States.
†See Table 14 in the special section of this report for numbers of U.S. citizens, permanent residents, and temporary residents.
§Includes mathematics and computer sciences.

Race/Ethnicity of U.S. Citizens

The representation of racial/ethnic minorities in the Ph.D. population continues to be an important issue (see Appendix Table B-2 for trend data and all citizenship groups). As shown in Figure 5, American Indians and Hispanics have been slowly growing in doctorate production since 1979, although both groups declined somewhat in the last two years.[6] American Indians earned 81 Ph.D.s (0.3 percent of the cohort) in 1979; and 115 (0.5 percent) in 1987; this year, however, only 93 American Indians received doctorates (just over 0.4 percent of the cohort). Hispanics received 462 Ph.D.s (1.9 percent) in 1979 and 618 doctorates (2.7 percent) in 1987, their peak year, but also declined slightly in 1989, falling to 569 doctorates (2.4 percent). The upward trend through 1987 for Hispanic Ph.D.s was primarily a function of the increase in female doctorates while their decline in the past two years was due to a decrease in the numbers of both men and women. In contrast to these groups, Asians have grown in doctorate production at a faster rate; they received 428 Ph.D.s (1.8 percent) in 1979 and 624 (2.7 percent) in 1989. This was due to an increase in the numbers of both men and women although the number of Asian women increased in greater proportion than the number of men.



NOTE: See Appendix Table B-2 and Technical Notes in Appendix C for rates of nonresponse to the question on race/ethnicity.

FIGURE 5 Percentage of doctorates earned by U.S. minorities, 1979 and 1989.

[6]Data on race/ethnicity are not available before 1974; therefore, comparisons with the previous year, 1973, cannot be made.

TABLE 4 Race/Ethnicity of Doctorate Recipients, by Major Field, 1989 (U.S. citizens)

Field	Total U.S.*	American Indians	Asians	Blacks	Hispanics	Whites
Total All Fields	22,785	93	624	811	569	20,688
Physical Sciences	3,136	18	117	35	70	2,896
Physics/Astronomy	651	5	33	5	12	596
Chemistry	1,268	5	42	20	40	1,161
Earth, Atmos. & Marine Sci.	519	6	11	3	6	493
Mathematics	378	0	13	6	8	351
Computer Sciences	320	2	18	1	4	295
Engineering	1,809	7	172	23	33	1,574
Life Sciences	4,424	12	138	75	83	4,116
Biological Sciences	3,046	7	120	44	59	2,816
Health Sciences	715	3	11	24	10	667
Agricultural Sciences	663	2	7	7	14	633
Social Sciences	4,137	18	71	163	124	3,761
Psychology	2,571	11	38	94	82	2,346
Anthropology	241	1	3	6	6	225
Economics	415	1	15	7	10	382
Poli. Sci. & Int'l. Relat.	300	1	4	14	6	275
Sociology	277	1	7	25	16	228
Other Social Sciences	333	3	4	17	4	305
Humanities	2,662	7	40	72	83	2,460
History	422	1	6	17	14	384
Amer. & English Lang. & Lit.	586	3	4	15	10	554
Foreign Lang. & Lit.	275	0	4	10	32	229
Other Humanities	1,379	3	26	30	27	1,293
Education	5,151	24	55	389	151	4,532
Teacher Education	376	2	3	21	15	335
Teaching Fields	783	0	12	54	24	693
Other Education.	3,992	22	40	314	112	3,504
Professional/Other	1,466	7	31	54	25	1,349
Business & Management	650	1	15	12	7	615
Communications	222	1	3	13	6	199
Other Professional Fields	561	5	11	27	12	506
Other Fields	33	0	2	2	0	29

NOTE: See Technical Notes in Appendix C for the rate of nonresponse to this question. See Appendix B, Table 2 for trend data on gender and race/ethnicity for all citizenship groups.

*Includes only U.S. citizens whose racial/ethnic group is known.

Meanwhile, the number of U.S. blacks receiving Ph.D.s fell somewhat since last year but has still not fallen to their low point in 1987; their number increased from 767 doctorates in 1987 to 811 in 1989 (3.5 percent of the cohort). Nevertheless, because of the steadily falling numbers of black men earning the Ph.D., blacks have experienced a decline of 23 percent since 1979, when they earned 1,056 doctorates (4.4 percent of the cohort). However, the number of black men who received doctorates increased slightly since last year, its lowest level of the decade, with the 323 doctorates awarded to black men in 1989 being the highest number awarded since 1985, while the number of black women receiving Ph.D.s declined somewhat in 1989.

As Table 4 shows, the largest share of U.S. minorities (except Asians) earned their doctoral degrees in the field of education in 1989: 26 percent of American Indians, 27 percent of Hispanics, and 48 percent of blacks. The second most frequently chosen field for two of these three groups was social sciences: 22 percent of Hispanics and 20 percent of blacks. For American Indians social sciences tied with physical sciences at 19 percent. The majority of these social science doctorates were concentrated in psychology. Among Asian Americans, the most frequent field choice was engineering, where 172 out of 624 received their degrees (28 percent), followed by life sciences (22 percent), with most doctorates concentrated in the biological sciences.

As shown in Table 5, during the 1986-1989 period, most white Ph.D. recipients had received their baccalaureate degrees from the University of California-Berkeley, and the greatest number of Hispanics had received their baccalaureates from the University of Puerto Rico-Rio Piedras. The table also shows that most programs serving large numbers of Asians were found in the West: California (9), Washington (1), and Hawaii (1). Of the schools from which blacks received their baccalaureates, Howard University topped the list, and all but 3 of the top 20—Wayne State University, New York University, and CUNY-City College—are "historically black colleges and universities" (HBCUs).

TABLE 5 Baccalaureate Institutions of 1986-1989 Ph.D.s, by Race/Ethnicity (ranked on number of Ph.D.s)

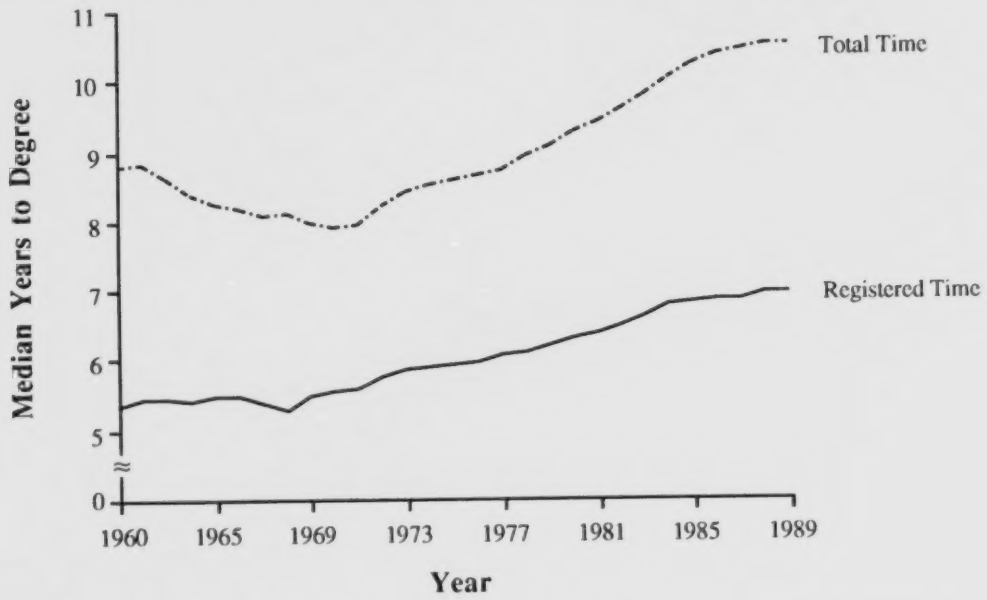
Institution	Number	Institution	Number
Asians		Hispanics	
Univ. of California-Berkeley	137	Univ. of Puerto Rico-Rio Piedras	321
Univ. of Hawaii-Manoa	115	Univ. of Puerto Rico-Mayaguez	74
Univ. of California-Los Angeles	73	Univ. of Texas-Austin	37
Massachusetts Inst. of Technology	38	Univ. of California-Berkeley	35
Stanford Univ.	34	Univ. of New Mexico	33
Univ. of California-Davis	33	Univ. of Texas-El Paso	32
Univ. of Illinois-Urbana	29	Univ. of California-Los Angeles	30
Cornell Univ.	28	Univ. of Miami	28
Univ. of Washington	26	Univ. of Florida	27
Harvard Univ.	24	California State Univ.-Los Angeles	26
Univ. of Michigan	22	Catholic Univ. of Puerto Rico	23
Yale Univ.	21	Univ. of Arizona	22
California Inst. of Technology	21	Univ. of California-Santa Barbara	22
Univ. of Chicago	20	CUNY-City College	21
Northwestern Univ.	20	New York Univ.	21
Univ. of California-San Diego	20	Pan American Univ.	20
Univ. of Maryland	18	Texas A & I Univ.	18
Pomona College	18	Rutgers Univ.	17
San Francisco State Univ.	16	New Mexico State Univ.	17
Univ. of California-Irvine	15	Univ. of California-Santa Cruz	17
Blacks		Whites	
Howard Univ.	91	Univ. of California-Berkeley	1041
Spelman College	51	Univ. of Michigan	927
Hampton Univ.	50	Univ. of Illinois-Urbana	914
Morgan State Univ.	47	Penn State Univ.	874
Tuskegee Univ.	44	Cornell Univ.	836
Jackson State Univ.	44	Univ. of Wisconsin-Madison	790
Southern Univ.	42	Michigan State Univ.	690
Wayne State Univ.	40	Ohio State Univ.	681
North Carolina Central Univ.	40	Univ. of Minnesota-Minneapolis	665
North Carolina Ag. & Tech. St .Univ.	38	Univ. of California-Los Angeles	663
Virginia State Univ.	35	Rutgers Univ.	627
South Carolina State College	32	Univ. of Texas-Austin	614
Fisk Univ.	32	Indiana Univ.-Bloomington	537
Univ. of the District of Columbia	28	Harvard Univ.	535
Tennessee State Univ.	26	Brigham Young Univ.	531
New York Univ.	25	Massachusetts Inst. of Technology	520
Cheyney Univ. of Pennsylvania	25	Univ. of Maryland	520
Florida Ag. & Mech. Univ.	25	Univ. of Washington	514
CUNY-City College	24	Purdue Univ.	513
Morris Brown College	24	Univ. of Colorado-Boulder	502

NOTE: Because of the small number of doctorates awarded to American Indians, baccalaureate institutions for this group are not included.

Time-to-Degree

Two time measures, total time and registered time,[7] can be extracted from the survey's item on educational history (see item 13 of the questionnaire in Appendix D). Changes in time lapse signify different graduate school enrollment patterns for the two measures of time-to-degree. The growth of RTD means that students are spending more time enrolled in graduate school. When TTD grows more than RTD, it means that students are also increasing their time out of graduate school—either by delaying their entrance into a graduate program or by dropping out for some period(s) of time prior to the completion of the program.[8]

By either dimension, time-to-degree has increased over the last 30 years: 30 percent for RTD and 19 percent for TTD. Figure 6 shows that RTD fluctuated throughout the 1960s before beginning a steady increase in 1969: RTD rose from a median 5.3 years in 1960 to 6.9 years in 1989, an all-time high and increase of 1.6 years. TTD declined from a



NOTE: See Table 6 and Technical Notes in Appendix C for rates of nonresponse to the applicable questions.

FIGURE 6 Median years to degree for doctorate recipients, all fields combined, 1960-1989.

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[7]Total time-to-degree (TTD) is a gross measure and refers to the number of years elapsed between earning the baccalaureate and the doctorate. Registered time-to-degree (RTD) is a net measure of time lapse and is derived by subtracting the years a recipient was not in graduate school between earning a baccalaureate and a Ph.D. The median rather than the mean is used as the measure of central tendency because the distribution is skewed.

[8]For a thorough treatment of issues surrounding changes in time-to-degree, see H. Tuckman, S. Coyle, and Y. Bae, *On Time To the Doctorate: A Study of the Increased Time to Complete Doctorates in Science and Engineering*, Washington, D.C.: National Academy Press, 1990.

TABLE 6 Median Years to Degree for Doctorate Recipients, by Broad Field for Selected Years, 1960-1989

Field	1960	1965	1969	1973*	1977	1981	1985	1989
Total All Fields								
Registered	5.3	5.5	5.5	5.8	6.1	6.4	6.8	6.9
Total	8.8	8.2	8.0	8.4	8.7	9.4	10.2	10.5
Physical Sci.†								
Registered	5.0	5.2	5.2	5.7	5.7	5.7	6.0	6.1
Total	6.5	6.2	6.0	6.7	6.9	6.8	7.2	7.3
Engineering								
Registered	5.0	5.2	5.3	5.6	5.6	5.7	5.8	6.0
Total	7.4	7.0	7.0	7.7	7.5	7.9	8.1	8.1
Life Sciences								
Registered	5.2	5.4	5.4	5.5	5.7	5.9	6.3	6.6
Total	8.0	7.4	6.9	7.2	7.3	7.4	8.4	9.1
Social Sciences								
Registered	5.3	5.4	5.4	5.7	5.9	6.5	7.1	7.4
Total	8.8	7.9	7.4	7.6	8.0	8.9	9.9	10.3
Humanities								
Registered	5.9	5.9	6.0	6.4	7.1	7.7	8.3	8.4
Total	10.1	9.5	9.4	9.2	9.9	10.8	11.8	12.5
Education								
Registered	6.5	6.9	6.3	6.1	6.4	7.0	7.6	8.2
Total	12.9	13.7	13.4	12.5	12.5	13.5	15.1	17.3
Prof./Other								
Registered	5.2	5.2	5.3	5.9	6.1	6.5	7.2	7.5
Total	11.8	11.3	10.5	10.0	10.6	11.1	12.9	13.2

NOTE: Medians are based on the number of individuals who have provided complete information about their postbaccalaureate education. See Technical Notes in Appendix C for rates of nonresponse to the applicable questions.

*Prior to 1989, 1973 was the peak year for doctorates in the United States.
†Includes mathematics and computer sciences.

median 8.8 years to a median 7.9 years between 1960 and 1970, after which it began a steady rise to a high of 10.5 years in 1988 and 1989. The difference between low and high TTD represents an increase of 1.7 years.

While all broad fields experienced the basic pattern of lengthening registered and total time-to-degree between 1960 and 1989, the source and size of the change varied enormously by field (see Table 6). In general, recipients in social sciences and in the nonsciences experienced longer time lapses than natural scientists. Over the last 30 years, the median RTD has risen for recipients in all fields. In 1960, the 7 broad fields varied in RTD by up to 1.5 years, ranging from 5.0 years for physical sciences and engineering to 6.5 years for education. By 1989 the spread had widened, with engineering doctorates showing the shortest RTD at 6.0 years and humanities showing the longest at 8.4 years. The social sciences and nonsciences experienced the greatest lengthening of both RTD and TTD over the 30-year period.

Evaluation of RTD and TTD for the various demographic groups reveals quite noticeable differences for all fields combined. Table 7 shows that both RTD and TTD were longer for women than for men; and they were longer for U.S. citizens than for foreign citizens. Blacks showed the longest times-to-degree for all racial/ethnic groups and Asians showed the shortest times. Differences between the groups were much smaller when the fields were disaggregated because time-to-degree is primarily field related.

TABLE 7 Median Years to Degree for Doctorate Recipients, by Demographic Group and Broad Field, 1989

	All Fields	Physical Sci.*	Engineering	Life Sci.	Social Sci.	Humanities	Education	Prof./Other
RTD Years								
All Ph.D.s	6.9	6.1	6.0	6.6	7.4	8.4	8.2	7.5
Men	6.7	6.2	6.0	6.5	7.4	8.2	8.0	7.4
Women	7.4	6.1	5.8	6.6	7.4	8.7	8.2	7.6
U.S. Citizens	7.2	6.1	6.0	6.6	7.5	8.6	8.4	7.7
Permanent Res.	7.1	6.8	6.6	6.7	8.1	8.0	6.9	8.2
Temporary Res.	6.2	6.2	5.9	6.3	6.7	7.6	6.0	6.6
U.S. Citizens								
American Indians	7.5	†	†	†	†	†	7.8	†
Asians	6.8	6.0	6.4	6.5	7.3	10.2	8.3	8.1
Blacks	8.3	7.6	7.2	6.8	8.2	8.8	8.6	8.4
Hispanics	7.4	6.5	5.8	6.3	8.2	8.2	8.6	7.8
Whites	7.2	6.1	5.9	6.6	7.5	8.6	8.4	7.6
TTD Years								
All Ph.D.s	10.5	7.3	8.1	9.1	10.3	12.5	17.3	13.2
Men	9.6	7.4	8.2	8.9	10.1	12.1	16.7	12.6
Women	12.5	7.3	7.2	9.6	10.7	13.0	17.8	14.3
U.S. Citizens	11.1	7.1	7.6	9.0	10.4	12.7	17.8	14.3
Permanent Res.	10.0	8.4	8.8	9.6	11.4	11.5	12.7	12.4
Temporary Res.	9.2	7.8	8.4	9.7	9.7	11.4	12.7	11.1
U.S. Citizens								
American Indians	13.1	†	†	†	†	†	15.5	†
Asians	9.2	6.9	8.5	8.0	9.5	13.9	19.5	12.3
Blacks	15.5	8.9	8.8	9.7	10.6	13.9	18.0	18.1
Hispanics	11.7	7.8	9.3	8.4	11.7	12.5	17.1	14.0
Whites	11.1	7.0	7.4	9.0	10.4	12.6	17.8	14.2

NOTE: Medians are based on the number of individuals who have provided complete information about their postbaccalaureate education. See Technical Notes in Appendix C for rates of nonresponse to the applicable questions.

*Includes mathematics and computer sciences.
†The number of American Indians in this field was too small for medians to be meaningful.

Postgraduation Plans

Status

The postgraduation plans of new doctorate recipients have been changing since 1973 and include a steady movement toward postdoctoral education, although most new recipients still prefer employment to continued education. As shown in Table 8, across all fields in 1989, 16,650 doctorates (74 percent of recipients with definite commitments) planned employment, and 5,801 (26 percent) planned study—the latter representing an increase of almost 10 percentage points since 1973. The movement towards continued

Table 8 Postgraduation Commitments of Doctorate Recipients, by Demographic Group and Broad Field, 1973, 1979, and 1989 (in percent)

	Employment			Study		
	1973*	1979	1989	1973*	1979	1989
Total Ph.D.s	20,063	16,985	16,650	3,868	4,215	5,801
	83.8	80.1	74.2	16.2	19.9	25.8
Men	83.6	79.2	71.8	16.4	20.8	28.2
Women	85.1	82.6	78.4	14.9	17.4	21.6
U.S. Citizens	85.4	80.7	76.6	14.6	19.3	23.4
Permanent Residents	68.1	77.7	72.8	31.9	22.3	27.2
Temporary Residents	76.4	76.5	64.3	23.6	23.5	35.7
U.S. Citizens & Perm. Residents†						
American Indians	84.6	86.8	81.5	15.4	13.2	18.5
Asians	61.4	73.7	66.6	38.6	26.3	33.4
Blacks	91.0	93.8	89.0	9.0	6.2	11.0
Hispanics	84.4	87.0	74.3	15.6	13.0	25.7
Whites	84.9	80.2	76.5	15.1	19.8	23.5
Physical Sciences§	60.9	63.0	52.6	39.1	37.0	47.4
Engineering	87.1	87.8	80.0	12.9	12.2	20.0
Life Sciences	58.1	45.8	41.5	41.9	54.2	58.5
Social Sciences	91.9	87.7	84.1	8.1	12.3	15.9
Humanities	96.2	94.4	94.3	3.8	5.6	5.7
Education	98.0	97.4	96.7	2.0	2.6	3.3
Professional/Other	98.6	97.5	97.2	1.4	2.5	2.8

NOTE: Only doctorates with definite commitments are included. Percentages are based on the number of Ph.D.s with known postgraduation plans. See Technical Notes in Appendix C for rates of nonresponse to the applicable questions and for further explanation of postgraduation plans.

*Prior to 1989, 1973 was the peak year for doctorates earned in the United States.
†Race/ethnicity is shown only for U.S. citizens and permanent residents because these recipients are the most likely to be long-term members of the U.S. labor force.
§Includes mathematics and computer sciences.

education, observed in all broad fields, was most pronounced in the physical and life sciences, especially in physics/astronomy and biological sciences. In 1989, the proportion of physical science Ph.D.s with study plans (47 percent) was almost as large as that for employment (53 percent), and life science Ph.D.s as a whole favored study opportunities (59 percent). The increased proportions in physical science and engineering fields of those who planned to study occurred since 1979 (their proportions actually decreased between 1973 and 1979); this dramatic shift to continued education during the last decade (10 percent and 8 percent, respectively) was due to the surge in the number of Ph.D.s earned by temporary residents (for further discussion of this item, see the special section on postdoctoral plans of non-U.S. doctorates on page 46). Disaggregation of the data by demographic group revealed a consistent pattern—that is, most Ph.D.s planned employment, but a shift toward postdoctoral study was noticeable.

Employment Sector in the U.S. Labor Force[9]

The changing role of the Ph.D and employment prospects in various sectors are of interest to researchers as well as prospective students. As can be seen in Table 9, in 1989, 51 percent of new Ph.D.s who planned to work in the United States after graduation found employment in academe, 21 percent in industry, 11 percent in government, and 17 percent in "other" sectors (which include nonprofit organizations and elementary/secondary schools). Academe employed the largest proportions of new Ph.D.s in all broad fields except physical sciences and engineering; in these two fields, industry employed 50 percent or more of Ph.D.s in 1989. Humanities doctorates were the most likely to work in academe (81 percent), while engineering doctorates were the least likely (27 percent).

Nonetheless, academe has declined as an employer since 1973, when 64 percent of new Ph.D.s were so employed: their percentage decreased about 10 points from 1973 to 1979 and another 3 points in the last decade and their numbers also dropped, from 11,482 to 6,945. The downward trend in academe between 1973 and 1979 was balanced somewhat by about 3-point increases in the percentages of new Ph.D.s employed in both government and "other". In 1979, industry started employing larger numbers of doctorates, increasing its share from 17 percent in 1979 to 21 percent in 1989. "Other" sectors also increased from about 15 percent in 1979 to about 17 percent in 1989.

While most broad fields shared in academe's decline over the period, dropping the most precipitously were percentages in social sciences (from 69 percent to 48 percent) and education (from 60 percent to 45 percent). The other employment sectors—government, industry, and "other"—showed increases in these fields. Humanities' decrease of 11 percentage points in academe was balanced by increases in government and "other," while industry accommodated the 14-point dropoff in physical sciences and the 12-point decline in life sciences. Since 1973, professional/other fields declined the least in academe, falling only 4 points. It is interesting to note that engineering has actually increased 2 points since 1973, and although still well below the proportions of that year, the percentages of Ph.D.s in physical sciences, humanities, and professional/other fields who plan to work in academe have grown since 10 years ago.

Further disaggregation of the data by demographic group reveals a consistent pattern of diminishing proportions of new Ph.D.s employed in academe. From 1973 to 1989 the percentage of men with commitments in the academic sector decreased from

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[9]Because researchers are primarily interested in the employment situation of doctorates within this country, the discussion of new Ph.D.s' employment commitments is restricted to the U.S. labor force—that is, U.S. citizens and permanent residents only. For a discussion of non-U.S. citizens' participation in the U.S. labor force, see page 50 in the special section of this report.

TABLE 9 Employment Sector of Doctorate Recipients with Postgraduation Commitments in the United States, by Demographic Group and Broad Field, 1973, 1979, and 1989 (U.S. citizens and permanent residents, in percent)

	Academe			Industry/Self Employment			Government			Other		
	1973*	1979	1989	1973*	1979	1989	1973*	1979	1989	1973*	1979	1989
Total Ph.D.s (No.)	11,482	8,046	6,945	2,056	2,520	2,789	2,069	1,936	1,442	2,239	2,276	2,355
	64.3	54.4	51.3	11.5	17.1	20.6	11.6	13.1	10.7	12.5	15.4	17.4
Men	62.3	51.2	47.1	13.0	20.6	26.0	12.4	14.0	11.7	12.4	14.3	15.1
Women	74.7	62.5	56.9	4.2	8.4	13.4	7.8	11.0	9.2	13.3	18.0	20.4
American Indians	63.6	60.0	39.6	0.0	6.7	28.3	18.2	11.1	13.2	18.2	22.2	18.9
Asians	44.6	31.9	38.8	40.9	51.6	45.7	9.3	10.2	7.3	5.3	6.4	8.2
Blacks	73.9	60.4	57.7	4.5	7.6	8.5	7.1	15.5	12.7	14.5	16.5	21.1
Hispanics	69.0	70.2	54.9	9.5	8.5	16.6	12.1	13.1	12.5	9.5	8.2	16.0
Whites	63.5	54.6	51.5	11.5	16.2	20.1	12.1	13.2	10.7	12.9	16.0	17.8
Physical Sciences†	49.5	34.1	36.4	29.0	49.7	51.0	18.6	13.9	10.8	2.9	2.4	1.8
Engineering	24.8	24.4	27.3	51.1	56.2	56.2	20.0	17.1	14.6	4.0	2.3	1.9
Life Sciences	63.5	59.6	52.3	13.7	19.4	25.1	16.6	15.2	15.0	6.3	5.8	7.5
Social Sciences	69.1	55.6	48.4	5.2	11.6	18.0	14.5	18.4	15.3	11.2	14.4	18.2
Humanities	92.0	79.2	80.8	1.4	4.9	5.4	1.7	4.6	2.9	4.9	11.3	10.9
Education	59.8	52.3	45.4	1.8	4.5	7.1	9.4	12.3	10.1	29.0	31.0	37.4
Professional/Other	80.4	73.5	76.4	6.4	8.1	8.8	6.4	8.9	4.3	6.8	9.5	10.5

NOTE: Only doctorates with definite commitments for employment are included. Foreign locations are excluded. Percentages are based on the number of Ph.D.s
with known employment sector. See Technical Notes in Appendix C for rates of nonresponse to this question.

*Prior to 1989, 1973 was the peak year for doctorates earned in the United States.
†Includes mathematics and computer sciences.

62 percent to 47 percent, and the percentage of women fell from 75 percent to 57 percent. A look at the movement into other sectors shows the proportions of both male and female doctorates grew between 1973 and 1989. In the industrial sector the proportion of men doubled, although their actual number dropped from 2,159 in 1979 to 2,007 in 1989. Meanwhile, the proportion of women in industry more than tripled, and the number of women increased dramatically from 361 in 1979 to 782 in 1989.

In 1989, the majority of U.S.-citizen black and Hispanic Ph.D.s reported employment commitments in academe (58 percent and 55 percent, respectively), while the greatest number of U.S. Asians reported commitments in industry (46 percent). (American Indians who earned doctorates were too few in number to be analyzed.) Although the proportions of U.S. blacks employed in the academic sector were still large in 1989, they showed a decline since 10 years ago, when their proportion was 60 percent. Hispanics showed a larger proportional decline, dropping 15 points during the 1979-1989 period.

Work Activity in the U.S. Labor Force

Table 10 reveals that the largest proportion of U.S. citizens and permanent residents continued to indicate teaching as their primary work activity in 1989 (38 percent), followed by research and development, or R&D (28 percent), administration (15 percent), professional services (15 percent), and "other" (4 percent). Since 1973, however, teaching's share of new doctorates has fallen 17 percentage points, and its numbers have decreased from 9,461 to 4,916. R&D's share, on the other hand, has increased 7 percentage points, although its numbers have dropped slightly from 3,658 to 3,623 Ph.D.s. Over the same period, administration and professional services have gained 3 and 6 percentage points, respectively, in their proportionate shares. Yet, the number of Ph.D.s working in administration decreased during the period from 2,084 to 1,958, while the number in professional services increased from 1,589 to 1,951.

Disaggregation of the data for 1973 and 1989 by sector reveals that, in academe, teaching has declined as a primary work activity (from 81 percent to 66 percent), but R&D has increased (from 8 percent to 19 percent). In fact, academe was the only sector to demonstrate proportionate growth in R&D since 1973, and the number of Ph.D.s in the academic sector working in R&D in 1989 (1,278) was also higher than in 1973 (920). In industry, meanwhile, R&D's proportionate share of activity fell from 72 percent of doctorates in 1973 to 60 percent in 1989, although the number grew from 1,415 to 1,575. At the same time, the percentage of Ph.D.s performing professional services in the industrial sector rose 10 points (from 16 percent in 1973 to 26 percent in 1989), corresponding to more than a two-fold increase in number (from 317 to 691). This increase was in large part attributable to the growing pool of self-employed individuals, especially in social work and in clinical, counseling, and educational psychology. In both 1973 and 1989, doctorates who obtained jobs in government were most inclined to work in R&D, followed in almost equal proportions by activities in administration and professional services. Doctorates employed in "other"[10] sectors also showed their largest shares in administration and professional services.

By field of doctorate, R&D was the most frequently reported activity in physical sciences and engineering in 1989, as it was in 1973. The largest proportion of life science doctorates also planned R&D as their primary work activity (38 percent in 1973; 44 percent in 1989), but teaching employed a significant share as well in these fields (45 percent in 1973; 29 percent in 1989). In 1989, doctorates in education leaned slightly more toward administration than teaching (41 percent versus 38 percent), and those in social sciences

[10]"Other" refers mainly to elementary/secondary schools and nonprofit organizations.

TABLE 10 Primary Work Activity of Doctorate Recipients with Postgraduation Commitments in the United States, by Sector and Broad Field, 1973, 1979, and 1989 (U.S. citizens and permanent residents, in percent)

	R&D			Teaching			Administration			Prof. Services			Other		
	1973*	1979	1989	1973*	1979	1989	1973*	1979	1989	1973*	1979	1989	1973*	1979	1989
Total Ph.D.s (No.)	3,658	3,593	3,623	9,461	6,044	4,916	2,084	2,054	1,958	1,589	1,651	1,951	307	467	460
	21.4	26.0	28.1	55.3	43.8	38.1	12.2	14.9	15.2	9.3	12.0	15.1	1.8	3.4	3.6
Academe	8.3	12.9	19.2	81.4	72.9	65.7	6.6	9.1	9.1	3.0	3.8	4.8	0.6	1.2	1.3
Industry/Self-Empl.	72.3	69.3	60.0	1.5	1.1	1.6	4.5	4.9	4.6	16.2	17.0	26.3	5.5	7.7	7.4
Government	49.7	42.1	41.3	4.1	3.3	3.7	19.9	25.4	25.3	21.9	23.2	24.1	4.4	6.0	5.6
Other	16.1	11.7	9.2	17.4	21.1	19.3	40.7	37.6	40.1	23.6	25.4	26.8	2.1	4.2	4.6
Physical Sci.†	48.0	67.0	64.5	43.1	24.3	25.2	2.7	2.5	2.5	4.0	3.4	4.7	2.1	2.8	3.1
Engineering	67.5	72.3	72.7	19.1	16.9	15.7	3.9	2.2	2.3	6.5	4.5	6.4	3.0	4.1	2.9
Life Sciences	38.0	46.3	44.2	44.5	33.3	29.0	4.2	5.6	7.5	9.6	9.6	14.6	3.7	5.3	4.8
Social Sciences	16.7	22.3	24.0	58.6	42.5	29.0	5.3	5.6	6.1	18.1	27.3	38.2	1.3	2.4	2.7
Humanities	2.8	5.0	7.1	90.6	78.9	76.1	3.2	6.6	5.1	2.0	3.9	5.9	1.4	5.7	5.8
Education	6.4	6.5	5.8	47.9	42.4	37.8	33.2	36.9	40.9	11.3	11.9	12.5	1.2	2.3	3.0
Professional/Other	8.4	11.3	22.6	73.2	63.2	54.5	10.1	13.1	9.1	6.8	8.1	10.2	1.5	4.4	3.6

NOTE: Only doctorates with definite commitments for employment are included. Foreign locations are excluded. Percentages are based on the number of Ph.D.s with known employment sector and work activity. See Technical Notes in Appendix C for rates of nonresponse to these questions.

*Prior to 1989, 1973 was the peak year for doctorates earned in the United States.
†Includes mathematics and computer sciences.

were most inclined to perform professional services (38 percent). This is a change from 1973 when these two fields showed teaching with the largest proportions (48 percent and 59 percent, respectively). In 1989, teaching remained the primary work activity for doctorates in humanities (76 percent) and professional fields (55 percent) as it was in 1973 (91 percent and 73 percent, respectively).

FINANCIAL SUPPORT OF DOCTORAL EDUCATION

Primary Source of Support

In 1987 the survey question regarding sources of financial support in graduate school was changed from earlier questionnaires in two respects. The most significant change was that several new categories were added, allowing respondents to identify more accurately the type of support that they had received.[11] Because of the apparent shifts in distribution, time-series data through 1986 are no longer comparable with the data collected in the last three years, so this report discusses only 1989 data.

Table 11 presents a frequency distribution of doctorates among "primary" sources (i.e., the sources with the largest reported percentages). In 1989, new Ph.D.s reported that personal and university sources provided the largest amounts of their graduate support: 41 percent each. Another estimated 11 percent of support came from the federal government[12] and 7 percent from "other" sources. Table 11 further compares the primary sources of support of new Ph.D.s in 1989, by broad field and demographic group. Doctorates in some fields relied on certain sources more than students in other fields. In general, doctorates in physical sciences, life sciences, and engineering were mostly supported from university sources, while personal sources, for the most part, supported students in social sciences and the nonsciences: education (77 percent), professional/other (54 percent), social sciences (53 percent), and humanities (48 percent). In contrast, those earning Ph.D.s in physical sciences furnished only 14 percent from personal sources. University sources, on the other hand, provided 60 percent of the support for physical science doctorates but only 15 percent for education doctorates. Differences among the demographic groups were largely related to field rather than to demographic group per se. For example, Table 4 (page 12) shows the breakout by field for each of the groups. Those fields in which many of the groups are concentrated—i.e., education and social sciences—are also the fields in which doctorates reported primary support from personal sources.

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[11] In 1987 the new categories included NSF, NIH, and other federal research assistantship (RA), and foreign (non-U.S.) government support. In 1988, categories for USDA fellowship and RA were added (see item 18 of the survey questionnaire in Appendix D). The addition of the federal RA categories has had the effect of reducing the reported number of university RAs. A solution for time-series analysis would be to look at RAs as a single type of support mechanism rather than as split between university-related and federal support.

[12] Federal support may be understated because additional support provided indirectly through federal loan programs is included under "personal"; federal support provided through universities may be included under "university."

TABLE 11 Primary Sources of Support for Doctorate Recipients, by Broad Field and Demographic Group, 1989 (in percent)

Primary Source of Support	Total	Men	Women	U.S. Cit.	Perm. Res.	Temp. Res.	U.S. Citizens Am. Ind.	Asian	Black	Hisp.	White
Total All Fields											
Personal	40.7	34.5	51.6	48.4	32.0	14.7	51.8	31.7	58.8	45.7	48.7
University	40.5	44.0	34.6	35.1	52.9	57.5	26.5	40.0	25.5	31.2	35.4
Federal	11.4	12.6	9.2	12.0	8.2	9.7	19.3	20.4	8.3	15.9	11.7
Other	7.4	8.9	4.6	4.5	7.0	18.1	2.4	7.9	7.4	7.2	4.2
Physical Sciences*											
Personal	14.1	14.0	14.3	18.1	11.8	5.3	23.5	15.5	25.8	11.3	18.1
University	59.8	59.1	63.0	54.4	70.0	70.1	47.1	44.7	38.7	51.6	55.4
Federal	20.0	20.5	17.7	22.3	15.5	15.7	23.5	30.1	22.6	29.0	21.7
Other	6.1	6.4	5.0	5.1	2.7	8.9	5.9	9.7	12.9	8.1	4.8
Engineering											
Personal	16.2	16.5	13.3	21.8	20.5	9.8	14.3	17.9	23.8	31.3	22.0
University	54.7	54.4	57.9	46.6	60.7	61.9	28.6	50.0	38.1	25.0	47.0
Federal	15.8	15.2	22.5	20.2	12.0	12.0	57.1	19.1	4.8	18.8	20.4
Other	13.2	13.9	6.3	11.4	6.8	16.4	0.0	13.0	33.3	25.0	10.5
Life Sciences											
Personal	25.1	23.5	27.7	28.5	25.8	11.5	0.0	22.6	18.8	17.1	29.3
University	43.9	44.5	42.9	41.4	50.2	52.4	62.5	37.1	47.8	39.5	41.2
Federal	22.6	21.9	23.7	26.6	13.1	8.7	37.5	36.3	23.2	36.8	26.2
Other	8.4	10.1	5.7	3.5	10.9	27.4	0.0	4.0	10.1	6.6	3.3
Social Sciences											
Personal	53.1	48.2	59.1	58.6	48.2	25.2	62.5	49.2	48.9	61.3	59.1
University	35.5	39.4	30.8	32.5	38.2	50.5	25.0	37.7	30.4	27.0	32.8
Federal	6.0	5.6	6.5	6.4	3.7	4.6	12.5	6.6	17.0	6.3	5.9
Other	5.4	6.9	3.6	2.5	9.9	19.6	0.0	6.6	3.7	5.4	2.2
Humanities											
Personal	48.4	49.1	47.6	51.7	41.6	24.0	57.1	61.3	43.1	44.6	52.1
University	45.1	43.4	47.2	43.3	52.6	56.4	28.6	35.5	37.3	44.6	43.6
Federal	2.2	2.5	1.9	2.2	1.7	2.5	14.3	0.0	3.9	4.1	2.0
Other	4.2	5.0	3.3	2.7	4.0	17.1	0.0	3.2	15.7	6.8	2.3
Education											
Personal	76.5	74.4	78.0	80.0	57.3	38.8	81.0	82.0	76.9	68.6	80.6
University	14.5	13.7	15.1	13.0	34.4	27.4	4.8	12.0	16.6	14.0	12.7
Federal	2.5	2.9	2.1	2.4	0.8	3.7	9.5	4.0	2.4	12.4	2.1
Other	6.5	8.9	4.7	4.6	7.6	30.1	4.8	2.0	4.2	5.0	4.7
Professional/Other											
Personal	53.9	52.6	56.2	61.6	43.9	27.5	100.0	54.2	71.1	61.9	61.1
University	36.2	36.0	36.5	30.6	50.0	53.3	0.0	37.5	15.6	23.8	31.3
Federal	2.2	2.3	2.0	2.6	0.0	1.4	0.0	0.0	0.0	9.5	2.7
Other	7.7	9.1	5.2	5.2	6.1	17.8	0.0	8.3	13.3	4.8	4.9

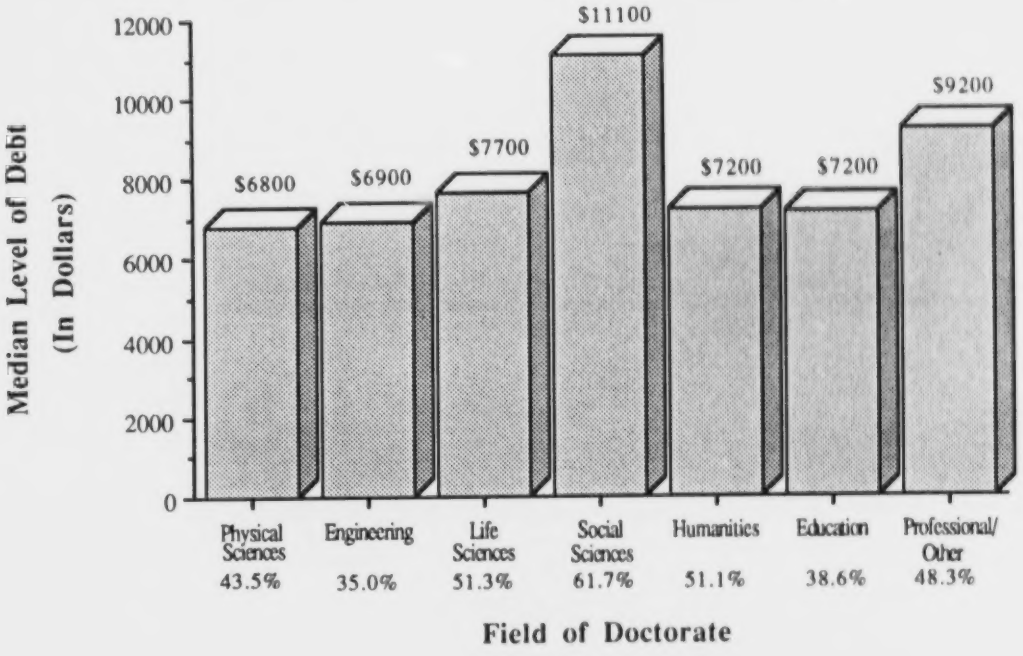
NOTE: A recipient's "primary" source of support is the source with the largest reported percentage. "Personal" includes loans as well as own earnings and contributions from the spouse/family. "Other" includes U.S. nationally competitive fellowships, business/employer funds, foreign government, and other nonspecified sources. Percentages in this table are based on the number of Ph.D.s with known primary support. See Technical Notes in Appendix C for rates of nonresponse to this question.

*Includes mathematics and computer sciences.

Indebtedness

The question on indebtedness was added to the survey in 1987 to determine if Ph.D.s have debt by the time they graduate and furthermore, the level of debt they would report. Of the 30,883 respondents to the debt question in 1989, over half (53 percent) reported finishing their doctoral programs with no debt related to their [redacted] education. Of the 14,426 (47 percent) who replied affirmatively and reported an amount of debt, 34 percent owed less than $5,000; 27 percent owed between $5,001 and $10,000; 25 percent owed between $10,001 and $20,000; 10 percent owed between $20,001 and $30,000; and 5 percent owed $30,001 or more. The median level owed for those with accumulated educational debt was approximately $8,000.

Figure 7 displays the percentages of indebted recipients and the median levels of their debts by field. Engineering recipients had the lowest frequency of cumulative debt, with debt reported by 35 percent of the cohort. They were followed by doctorates in education and in physical sciences (39 percent and 44 percent, respectively). Of those students in these three fields who did end their graduate work with debt, 39 percent



NOTE: Doctorate recipients who reported no debt are not included in median levels of debt. See Technical Notes in Appendix C for rates of nonresponse to the question on cumulative debt.

FIGURE 7 Median level of debt, by broad field, 1989.

reported owing $5,000 or less, with the median levels of debt being about $6,900 (engineering), $7,200 (education), and $6,800 (physical sciences). The field reporting not only the highest percentage of recipients with debt but also the highest median level of debt—$11,100—was social sciences, where 62 percent of graduates had accumulated debt at the end of their doctoral programs. This corroborates the reported primary source of support for social science Ph.D.s discussed in the previous section as having the highest percent supported through personal sources. In each of the three remaining broad fields, about half of the recipients reported at varying levels: $7,200 in humanities, $7,700 in life sciences, and $9,200 in professional/other fields. In Table 12, percentage and level of debt are displayed by demographic group. When considered by gender, percentages of doctorates with debt were similar: 47 percent of men and 48 percent of women. However, for men, the median level of debt (about $7,800) was lower than for women (about $8,300). Disaggregated by citizenship, the data show U.S. citizens reporting not only the greatest frequency of debt (55 percent, or more than 2.5 times that of temporary residents), but also much higher debt—$8,300 for U.S. citizens versus $5,100 for non-U.S. citizens with temporary visas. Among U.S. citizens, Asians had the smallest percentage of indebtedness (51 percent), and Hispanics had the largest (67 percent). American Indians had the highest median debt ($9,500), contrasted with a low of $8,200 reported by Asians.

TABLE 12 Level of Cumulative Debt for Doctorate Recipients, by Demographic Group, 1989

Demographic Group	Percent With Debt *	Median Dollars†
All Ph.D.s	47.1	$ 8,000
Men	46.7	7,800
Women	47.7	8,300
U.S. Citizens	55.4	8,300
Permanent Residents	35.1	7,400
Temporary Residents	20.6	5,100
U.S. Citizens		
American Indians	57.8	9,500
Asians	51.3	8,200
Blacks	63.3	9,300
Hispanics	66.9	9,300
Whites	54.8	8,200

*Percentages are based on known responses to the debt question. See Technical Notes in Appendix C for rates of nonresponse to this question.
†Rounded to the nearest hundred dollars. Doctorate recipients who reported no debt are not included.

From Table 13 we see that the group least frequently reporting debt at the end of their doctoral program was that which reported predoctoral status as full-time employed, 42 percent of whom were indebted, compared with 47 percent overall. The median level of debt of the full-time employed, $7,700, was also lower than the overall median. Two groups with similar and higher-than-average frequencies of reported debt were those with stated predoctoral status as part-time employment (54 percent) and those with fellowship support (57 percent); their median debt levels were $8,900 and $8,400, respectively. Although, the frequency of debt among those not employed (42 percent) was nearly the same as the full-time employed, their median level of debt was the highest of any group, $9,000.

TABLE 13 Level of Cumulative Debt for Doctorate Recipients, by Predoctoral Status, 1989

Predoctoral Status	Percent With Debt *	Median Dollars†
Full-time Employed	42.1	$ 7,700
Part-time Employed	53.8	8,900
Fellowship	56.7	8,400
Assistantship	49.5	7,500
Not Employed	42.3	9,000

*Percentages are based on known responses to the debt question. See Technical Notes in Appendix C for rates of nonresponse to this question.
†Rounded to the nearest hundred dollars. Doctorate recipients who reported no debt are not included.

NON-U.S. CITIZEN DOCTORATE RECIPIENTS

The special section of this report discusses the increasing participation of foreign citizens in U.S. doctoral education. It examines the growth pattern of non-U.S. Ph.D.s, especially of temporary visa-holders; their countries of origin; the fields in which they earned the doctorate; their primary sources of support in graduate school; and their postgraduation plans, with a focus on those individuals planning to work, at least temporarily, in the United States after graduation. Other topics, such as time-to-degree and level of cumulative debt, are addressed earlier in the report.

Number of Non-U.S. Citizen Doctorate Recipients

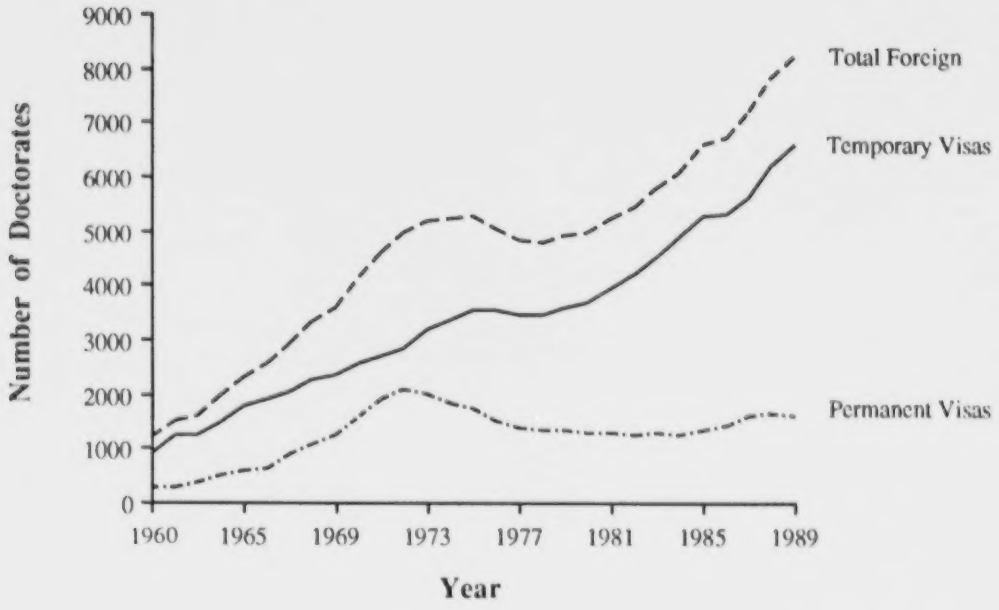
Over the past three decades, the number of doctoral degrees earned in this country by foreign nationals has increased dramatically. In 1989, there were 8,195 non-U.S. doctorate recipients, almost seven times the number in 1960 (1,176). During the same period, their proportion more than doubled from 12 percent to 26 percent. As Figure 8 shows, the number of foreign Ph.D.s grew steadily through 1975, declined somewhat in the next three years, started climbing again in 1979, and finally reached a new peak in 1989.

This increase in doctorate production among non-U.S. citizens was shared by both men and women, although men experienced the greater growth. In 1960, foreign men were awarded 1,060 Ph.D.s, or 12 percent of all degrees awarded to men; foreign women were awarded 116 Ph.D.s, or 11 percent of all degrees awarded to women. In 1989, foreign male Ph.D.s numbered 6,525 (or 33 percent of all men), and foreign female Ph.D.s numbered 1,670 (or 15 percent of all women).

It is apparent from both Figure 8 and Table 14 that temporary visa-holders have been largely responsible for the meteoric rise among non-U.S. Ph.D.s in this country, especially during the last decade. While in 1960 temporary residents earned only 897 Ph.D.s, or 9 percent of all U.S. doctorates, in 1989 they earned 6,590 Ph.D.s, or 21 percent of all doctorates. The curve for temporary residents in Figure 8 closely resembles the curve for all foreign Ph.D.s, showing growth into the mid-1970s with a peak in 1975, followed by a small three-year decline and then, in 1979, the beginning of renewed growth. Since 1979, temporary residents have earned an additional 3,000 Ph.D.s in this country and increased their share of all Ph.D.s from 12 percent to 21 percent.

The growth pattern of permanent visa-holders is substantially different from that of temporary visa-holders. Although they have increased both the number and proportion of U.S. doctorates in recent years, permanent residents remain well below their peak level of 2,093 Ph.D.s in 1972. In 1960, they were granted 279, or 3 percent, of all U.S. Ph.D.s. After reaching an all-time peak in 1972 with 2,093, or 7 percent, of all Ph.D.s, doctorate production among permanent residents declined until the mid-1980s. Since then, however,

their number of degrees has grown, dipping only slightly in 1989 to 1,605, or 5 percent, of all Ph.D.s.[13]



NOTE: See Table 14 for numbers of doctorates and Technical Notes in Appendix C for rates of nonresponse to the citizenship status question.

FIGURE 8 Visa status of non-U.S. citizen doctorate recipients, 1960-1989.

[13]In 1965, U.S. immigration and naturalization laws were amended to abolish the country quota system and, in its place, establish uniform restrictions for all countries. These changes may have affected the number of permanent visa-holders earning U.S. Ph.D.s in several ways: (1) many European countries and some Asian countries that had been leading suppliers of doctoral students up to 1965 were no longer eligible for the large numbers of permanent visas they had been issued in earlier years; (2) citizens of other countries now being admitted in sizable numbers may not have been as inclined to pursue doctoral degrees as the traditional suppliers; (3) Ph.D.s from the more underdeveloped countries may have elected to study on temporary instead of permanent visas and return home after graduation to assist in their countries' advancement; and (4) foreign scientists, who for a while enjoyed easy access to permanent visas, encountered new limitations in the early 1970s when competition from U.S. citizens could result in denial of a permanent visa. For additional information on the 1965 amendment, see the explanatory note for Appendix Table B-3 on page 88.

Table 14 Citizenship Status of Doctorate Recipients, 1960-1989

Year	Number				Percent		
	Total Ph.D.s	U.S. Citizens	Perm. Visas	Temp. Visas	U.S. Citizens	Perm. Visas	Temp. Visas
1960	9,733	8,469	279	897	87.8	2.9	9.3
1961	10,413	8,961	256	1,050	87.3	2.5	10.2
1962	11,500	9,841	274	1,244	86.6	2.4	11.0
1963	12,728	10,925	354	1,251	87.2	2.8	10.0
1964	14,325	12,121	468	1,463	86.3	3.3	10.4
1965	16,340	13,772	560	1,753	85.6	3.5	10.9
1966	17,949	14,974	636	1,908	85.5	3.6	10.9
1967	20,403	17,029	876	2,048	85.3	4.4	10.3
1968	22,936	19,228	1,046	2,268	85.3	4.6	10.1
1969	25,743	21,541	1,235	2,334	85.8	4.9	9.3
1970	29,498	24,915	1,576	2,572	85.7	5.4	8.8
1971	31,867	26,758	1,907	2,690	85.3	6.1	8.6
1972	33,041	27,479	2,093	2,831	84.8	6.5	8.7
1973*	33,755	27,913	1,998	3,174	84.4	6.0	9.6
1974	33,047	26,343	1,826	3,359	83.6	5.8	10.7
1975	32,951	27,081	1,714	3,536	83.8	5.3	10.9
1976	32,946	27,269	1,494	3,529	84.4	4.6	10.9
1977	31,716	26,119	1,368	3,448	84.4	4.4	11.1
1978	30,875	25,291	1,344	3,421	84.1	4.5	11.4
1979	31,239	25,464	1,320	3,587	83.8	4.3	11.8
1980	31,020	25,221	1,291	3,644	83.6	4.3	12.1
1981	31,357	25,061	1,281	3,940	82.8	4.2	13.0
1982	31,111	24,391	1,228	4,204	81.8	4.1	14.1
1983	31,282	24,359	1,275	4,499	80.8	4.2	14.9
1984	31,337	24,027	1,224	4,832	79.9	4.1	16.1
1985	31,297	23,368	1,324	5,229	78.1	4.4	17.5
1986	31,895	23,080	1,432	5,276	77.5	4.8	17.7
1987	32,356	22,979	1,578	5,610	76.2	5.2	18.6
1988	33,480	23,273	1,618	6,192	74.9	5.2	19.9
1989	34,319	23,172	1,605	6,590	73.9	5.1	21.0

NOTE: Total Ph.D.s includes doctorates whose citizenship status is unknown. Percentages are based on the number of doctorates with known citizenship status. See Technical Notes in Appendix C for rates of nonresponse to this question.

*Prior to 1989, 1973 was the peak year for all doctorates earned in the United States. The all-time high for permanent residents occurred in 1972. Temporary resident Ph.D.s peaked once in 1975 and declined over the next few years, but since 1979 have increased their doctorate production each year.

Country of Origin

Through much of the past three decades, a relatively small group of countries have been the major sources of foreign nationals earning doctorates in the United States. The composition of the non-U.S. pool, however, has changed in recent years (see Table 15). Although Canada and traditional exchange points in western and northern Europe continue to send sizable numbers of doctoral students to the United States, more notable are the developing countries in the Americas, the Middle East, and the Far East, which have displayed significant increases in their numbers of doctorates earned in the United States. Since 1973, six countries have dropped off the list of the top 25 suppliers (the Philippines, France, Colombia, Chile, Belgium, and Argentina), and six new countries have emerged (the People's Republic of China, Saudi Arabia, Malaysia, Italy, Indonesia, and Jordan). Asian countries dominated the list in 1989, assuming 14 of the 25 positions (and 6 of the top 10). Of the major sources of foreign Ph.D.s in 1989, 7 countries are located in Eastern Asia, 7 in Western Asia, 4 in Europe, 3 in the Americas, and 2 each in Africa and the Pacific.[14]

In 1989, citizens of Taiwan received the largest number of Ph.D.s earned by non-U.S. citizens in this country: 962 doctorates, or 50 more than in 1988. The two countries exhibiting the most dramatic growth in recent years, however, are Korea (number 2 on the list) and the People's Republic of China (number 4). In 1989, Koreans earned 926 Ph.D.s, an 18 percent increase since 1988 (when they received 786 Ph.D.s) and an 88 percent increase since 1986 (when they received 493 Ph.D.s). (See page 10 in *Summary Report 1988* for data on 1986-1988 degrees). The People's Republic of China (PRC) has shown even greater growth, increasing its number of Ph.D.s by 29 percent in the past year (from 497 to 641 Ph.D.s) and more than tripling its number since 1986, when 205 Ph.D.s were awarded to PRC citizens. It should be noted that prior to the signing of the Understanding on Educational Exchanges in the fall of 1978, the PRC permitted its citizens to study only language fields in the United States. Once these students were allowed to study the sciences, their number of degrees rose rapidly; in 1983, only 15 Ph.D.s were awarded to PRC citizens, compared to 641 Ph.D.s today.

Table 16 presents a distribution by visa status of Ph.D.s native to the countries listed in Table 15. Most countries in 1989 had a disproportionately high number of temporary residents among recipients of U.S. doctoral degrees. The only countries showing more than one-third of their citizens as permanent residents were Colombia, England, France, Iran, and Nigeria.

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[14]In 1965, U.S. immigration and naturalization laws were amended to abolish the country quota system and, in its place, establish uniform restrictions for all countries. These changes affected the composition of the non-U.S. doctoral pool in the United States. See Appendix Table B-3 for data on all countries, presented in five-year groupings from 1960 to 1989. For additional information on immigration laws, see footnote 13 on page 32 and the explanatory note for Appendix Table B-3 on page 88.

Table 15 Top 25 Countries of Origin of Non-U.S. Citizen Doctorate Recipients, 1964, 1973, and 1989 (ranked on number of Ph.D.s)

1964*		1973		1989	
Country	Number	Country	Number	Country	Number
1. India	310	1. India	692	1. Taiwan, Republic of China	962
2. Canada	240	2. Canada	565	2. Republic of Korea§	926
3. Taiwan, Republic of China†	179	3. Taiwan, Republic of China†	620	3. India	676
4. Arab Republic of Egypt	91	4. England	211	4. People's Republic of China	641
5. England	80	5. Republic of Korea§	158	5. Canada	358
6. Republic of Korea§	68	6. Japan	118	6. Iran	215
7. Japan	54	7. Israel	117	7. England	155
8. Pakistan	48	8. West Germany#	106	8. Japan	144
9. The Philippines	39	9. Arab Republic of Egypt	104	9. Greece	141
10. Israel	45	10. Iran	97	10. Mexico	134
11. Australia	35	11. Turkey	96	11. West Germany#	134
12. Iran	34	12. Australia	96	12. Thailand	132
13. Greece	28	13. Thailand	80	13. Arab Republic of Egypt	127
14. West Germany#	28	14. The Philippines	78	14. Brazil	121
15. Iraq	24	15. Nigeria	74	15. Hong Kong	116
16. Thailand	23	16. France	71	16. Nigeria	113
17. Lebanon	22	17. Brazil	69	17. Israel	93
18. Mexico	20	18. Greece	56	18. Saudi Arabia	88
19. Turkey	16	19. Hong Kong	56	19. Turkey	88
20. Jordan	15	20. Colombia	53	20. Malaysia	77
21. Republic of Indonesia	14	21. Pakistan	51	21. Australia	77
22. France	13	22. Chile	44	22. Italy	75
23. Ireland◊	12	23. Belgium	44	23. Republic of Indonesia	72
24. Italy	12	24. Argentina	43	24. Jordan	71
25. New Zealand	12	25. Mexico	42	25. Pakistan	70

NOTE: See Technical Notes in Appendix C for rates of nonresponse to the country of citizenship question. See Appendix Table B-3 for trend data on all countries.

*1964 is used as the earliest year of comparison because response rates to the country of citizenship question were too low prior to that time.
†Includes "China, unspecified" in 1964 and 1973. It can be assumed that virtually all of these recipients are of Taiwanese citizenship because the People's Republic of China did not permit its citizens to study nonlanguage fields in the United States until after the signing of the Understanding on Educational Exchanges in the fall of 1978.
§Includes "Korea, unspecified." The Democratic People's Republic of Korea (North Korea) does not permit its citizens to study in the United States.
#Includes "Germany, unspecified." The German Democratic Republic (East Germany) did allow exchange students in the United States for partial preparation toward the Ph.D., but the degree was subsequently awarded by the home country institution. Virtually all German recipients of U.S. Ph.D.s have been West German.
◊Because of coding inconsistencies through the years, it is not always possible to determine whether a recipient was from the Republic of Ireland or Northern Ireland.

Table 16 Major Countries of Origin of Non-U.S. Citizen Doctorate Recipients, by Visa Status, 1964, 1973, and 1989

Region/Country	1964 Total Non-U.S. (No.)	1964 Perm. Visas %	1964 Temp. Visas %	1973 Total Non-U.S. (No.)	1973 Perm. Visas %	1973 Temp. Visas %	1989 Total Non-U.S. (No.)	1989 Perm. Visas %	1989 Temp. Visas %
Total Non-U.S. Citizens	1,931	24.2	75.8	5,172	38.6	61.4	8,195	19.6	80.4
Canada	240	19.6	80.4	565	19.6	80.4	358	27.1	72.9
Latin America, Total	82	19.5	80.5	382	18.1	81.9	589	19.5	80.5
Argentina	6	16.7	83.3	43	20.9	79.1	49	10.2	89.8
Brazil	9	44.4	55.6	69	1.4	98.6	121	12.4	87.6
Chile	10	20.0	80.0	44	13.6	86.4	51	13.7	86.3
Colombia	7	14.3	85.7	53	9.4	90.6	36	36.1	63.9
Mexico	20	5.0	95.0	42	16.7	83.3	134	17.2	82.8
Other	30	23.3	76.7	131	31.3	68.7	198	26.3	73.7
Europe, Total	252	36.9	63.1	734	39.8	60.2	927	27.8	72.2
England	80	36.3	63.8	211	43.6	56.4	155	41.9	58.1
France	13	38.5	61.5	71	47.9	52.1	69	37.7	62.3
Greece	28	32.1	67.9	56	32.1	67.9	141	19.1	80.9
Ireland*	12	50.0	50.0	26	26.9	73.1	43	30.2	69.8
Italy	12	25.0	75.0	32	34.4	65.6	75	28.0	72.0
West Germany†	28	42.9	57.1	106	48.1	51.9	134	29.1	70.9
Other	79	36.7	63.3	232	34.1	65.9	310	21.6	78.4
Western Asia, Total	534	9.4	90.6	1,229	32.8	67.2	1,582	22.2	77.8
India	310	7.1	92.9	692	38.2	61.8	676	19.4	80.6
Iran	34	29.4	70.6	97	33.0	67.0	215	48.8	51.2
Iraq	24	4.2	95.8	33	48.5	51.5	30	6.7	93.3
Israel	45	4.4	95.6	117	29.9	70.1	93	25.8	74.2
Jordan	15	6.7	93.3	32	12.5	87.5	71	22.5	77.5
Lebanon	22	13.6	86.4	29	31.0	69.0	53	28.3	71.7
Pakistan	48	4.2	95.8	51	25.5	74.5	70	8.6	91.4
Saudi Arabia	0	0.0	0.0	22	0.0	100.0	88	11.4	88.6
Turkey	16	18.8	81.3	96	18.8	81.3	88	19.3	80.7
Other	20	30.0	70.0	60	20.0	80.0	198	12.6	87.4

Eastern Asia, Total	341	15.8	84.2	1,102	53.1	46.9	3,033	10.9	89.1
Hong Kong	2	0.0	100.0	56	32.1	67.9	116	18.1	81.9
Japan	54	9.3	90.7	118	14.4	85.6	144	15.3	84.7
Rep. of Korea§	68	14.7	85.3	158	55.1	44.9	926	7.9	92.1
Malaysia	5	0.0	100.0	30	3.3	96.7	77	5.2	94.8
People's Rep. of China	0	0.0	0.0	0	0.0	0.0	641	4.8	95.2
Taiwan, Rep. of China#	179	21.2	78.8	620	71.3	28.7	962	16.8	83.2
Thailand	23	0.0	100.0	80	16.3	83.8	132	9.8	90.2
Other	10	10.0	90.0	40	17.5	82.5	35	14.3	85.7
Pacific, Total	100	12.0	88.0	243	22.2	77.8	238	12.6	87.4
Australia	35	22.9	77.1	96	24.0	76.0	77	19.5	80.5
Rep. of Indonesia	14	7.1	92.9	30	16.7	83.3	72	9.7	90.3
New Zealand	12	16.7	83.3	37	21.6	78.4	31	6.5	93.5
The Philippines	39	2.6	97.4	78	23.1	76.9	55	9.1	90.9
Other	0	0.0	0.0	2	0.0	100.0	3	33.3	66.7
Africa, Total	129	4.7	95.3	341	29.0	71.0	618	20.9	79.1
Arab Rep. of Egypt	91	6.6	93.4	104	48.1	51.9	127	11.0	89.0
Nigeria	0	0.0	0.0	74	27.0	73.0	113	34.5	65.5
Other	38	0.0	100.0	163	17.8	82.2	378	20.1	79.9
Country Unknown	253	75.1	24.9	576	66.8	33.2	850	34.6	65.4

NOTE: Specific countries listed in this table are the leading sources of non-U.S. citizens that appear in Table 15. See Technical Notes in Appendix C for rates of nonresponse to the country of citizenship question. See Appendix Table B-3 for trend data on all countries.

*Because of coding inconsistencies through the years, it is not always possible to determine whether a recipient was from the Republic of Ireland or Northern Ireland.
†Includes "Germany, unspecified." The German Democratic Republic (East Germany) did allow exchange students in the United States for partial preparation toward the Ph.D., but the degree was subsequently awarded by the home country institution. Virtually all German recipients of U.S. Ph.D.s have been West German.
§Includes "Korea, unspecified." The Democratic People's Republic of Korea (North Korea) does not permit its citizens to study in the United States.
#Includes "China, unspecified" in 1964 and 1973. It can be assumed that virtually all of these recipients are of Taiwanese citizenship because the People's Republic of China did not permit its citizens to study nonlanguage fields in the United States until after the signing of the Understanding on Educational Exchanges in the fall of 1978.

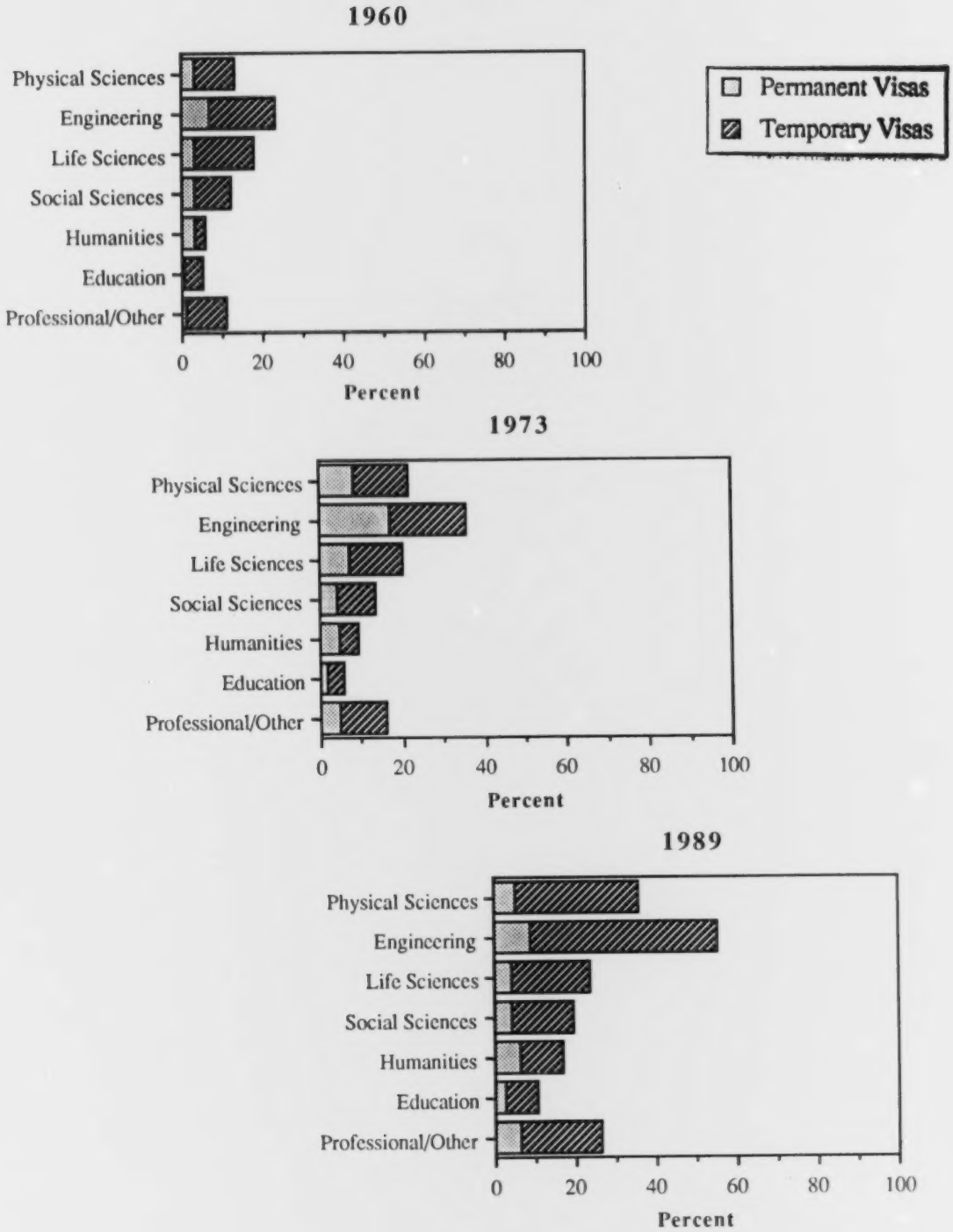
Field of Doctorate

While the number and proportion of foreign students have increased in all fields over the last 30 years, certain fields have experienced greater change than others. As both Figure 9 and Table 17 show, the largest increases occurred in the broad fields of engineering and physical sciences. Growth was the most marked in engineering, where the number of foreign Ph.D.s increased from 183 to 2,285 between 1960 and 1989, and their proportion of all engineering degrees increased from 23 percent to 55 percent. During the same period, the number of foreign Ph.D.s in physical sciences rose from 284 to 1,799, and their share of all degrees in the field rose from 13 percent to 36 percent. Life sciences and social sciences displayed more moderate growth, yet in 1989 the number of non-U.S. recipients reached 1,399 (or 24 percent) in life sciences and 1,033 (or 20 percent) in social sciences. Numbers and percentages were smaller in humanities (551 Ph.D.s, or 17 percent) and education (605 Ph.D.s, or 10 percent). In professional/other fields, non-U.S. citizens earned only 523 Ph.D.s, but they comprised a significant 26 percent of the field.

Further disaggregation of the data reveals a greater concentration of foreign recipients in certain subfields. Within physical sciences in 1989, the proportion of non-U.S. doctorates was 49 percent in mathematics, 42 percent in physics/astronomy, and 41 percent in computer sciences, compared to 36 percent overall. Differences also appear within life sciences, where 40 percent of all Ph.D.s in agricultural sciences were awarded to non-U.S. citizens versus 20 percent in biological sciences and 18 percent in health sciences. The social science field of economics granted 48 percent of its doctorates to foreign nationals in 1989, and political science/international relations granted 35 percent, compared to 20 percent for the discipline as a whole. Among the professional fields, a significant 33 percent of degrees in business and management were earned by non-U.S. citizens.

Table 17 also shows that, by far, the largest percentages of Ph.D.s awarded to foreign students were to temporary residents. In 1989 for all fields combined, the proportion of doctorates earned by temporary residents was four times greater than that for permanent residents (21 percent versus 5 percent). The shares were even more disparate in certain subfields, especially mathematics (45 percent for temporary residents versus 5 percent for permanent residents), physics/astronomy (37 percent versus 5 percent), agricultural sciences (36 percent versus 5 percent), and economics (41 percent versus 7 percent).

The major countries of origin of non-U.S. Ph.D.s in each broad field are presented in Table 18. Although Taiwan ranked first in total numbers of non-U.S. Ph.D.s in 1989 (see Table 15), it was the top supplier in only two of the seven broad fields: engineering (421 Ph.D.s) and life sciences (148 Ph.D.s). Taiwan ranked second in physical sciences (217 Ph.D.s) and third to fifth in all other fields except humanities. Of the 962 degrees granted to Taiwanese citizens in 1989, 44 percent were in engineering, 23 percent in physical sciences, and 15 percent in life sciences. Korea, the second largest source of non-U.S. Ph.D.s overall, is the only country listed in the top five for every broad field, ranking first in social sciences (170 Ph.D.s) and professional/other fields (92 Ph.D.s) and second in engineering (307 Ph.D.s, or one-third of all degrees awarded to Korean citizens). The People's Republic of China (PRC) was the leading supplier in physical sciences, with 318 Ph.D.s (or half of all degrees earned by PRC students). Another 24 percent of doctorates granted to PRC citizens were in engineering, and 19 percent were in life sciences. Canada was the leading supplier of non-U.S. recipients in humanities and education, with 50 doctorates in each field. Although Iran only appears on the list for engineering, it is noteworthy that half of all Ph.D.s received by its citizens were in this field (108 degrees).



NOTE: See Table 17 for numbers and percentages of doctorates; see Technical Notes in Appendix C for rates of nonresponse to the citizenship question.

FIGURE 9 Non-U.S. citizens as a proportion of all doctorate recipients in each broad field, 1960, 1973, and 1989.

Table 17 Non-U.S. Citizens as a Proportion of All Doctorate Recipients in Each Major Field for Selected Years, 1960-1989 (in percent)

Field	1960	1965	1969	1973	1977	1981	1985	1989
TOTAL ALL FIELDS (No.)	9,733	16,340	25,743	33,755	31,716	31,357	31,297	34,319
Permanent Visas	2.9	3.5	4.9	6.0	4.4	4.2	4.4	5.1
Temporary Visas	9.3	10.9	9.3	9.6	11.1	13.0	17.5	21.0
PHYSICAL SCIENCES (No.)	2,152	3,550	5,005	5,311	4,379	4,170	4,531	5,460
Permanent Visas	2.9	3.6	5.2	8.3	6.3	5.6	5.4	5.3
Temporary Visas	10.4	11.5	10.8	13.1	15.8	18.6	24.5	30.5
Physics/Astronomy (No.)	530	1,046	1,461	1,589	1,150	1,015	1,080	1,278
Permanent Visas	3.2	4.1	4.7	8.1	7.6	5.4	4.6	5.3
Temporary Visas	9.2	12.5	11.1	15.9	18.4	20.8	28.0	36.7
Chemistry	1,078	1,444	1,967	1,855	1,571	1,612	1,836	1,971
Permanent Visas (No.)	2.2	3.0	5.3	9.7	6.8	6.0	4.9	4.6
Temporary Visas	8.9	10.6	9.2	10.4	12.9	15.2	18.7	25.1
Earth, Atmos., and Marine (No.)	253	375	507	634	694	583	617	738
Permanent Visas	4.0	5.6	6.0	7.8	3.2	2.8	5.4	4.4
Temporary Visas	13.9	12.4	15.7	11.6	14.7	14.8	20.1	17.8
Mathematics (No.)	291	685	1,070	1,232	933	728	688	861
Permanent Visas	3.8	2.8	4.9	6.7	5.9	6.0	6.4	4.5
Temporary Visas	15.3	11.3	10.8	14.4	18.3	26.2	36.3	44.5
Computer Sciences* (No.)	N/A	N/A	N/A	N/A	N/A	232	310	612
Permanent Visas	N/A	N/A	N/A	N/A	N/A	8.8	7.9	9.9
Temporary Visas	N/A	N/A	N/A	N/A	N/A	17.5	29.5	31.2
ENGINEERING (No.)	794	2,074	3,265	3,364	2,643	2,528	3,166	4,536
Permanent Visas	6.8	6.8	10.9	16.8	12.7	12.5	10.5	8.7
Temporary Visas	16.3	15.7	14.4	18.7	30.1	39.0	47.1	46.5
LIFE SCIENCES (No.)	1,729	2,684	4,204	5,167	4,920	5,611	5,779	6,343
Permanent Visas	3.3	3.6	4.8	7.2	5.0	3.8	3.4	4.4
Temporary Visas	14.8	19.2	14.9	12.8	13.9	13.4	16.6	19.3

Biological Sciences (No.)	1,246	1,963	3,092	3,648	3,484	3,804	3,792	4,106
Permanent Visas	3.2	3.4	4.6	6.8	4.8	3.3	2.9	4.6
Temporary Visas	12.0	15.8	11.1	8.8	9.4	7.8	11.5	15.5
Health Sciences (No.)	69	145	297	486	511	657	729	985
Permanent Visas	0.0	6.3	5.9	6.7	9.4	5.5	5.1	2.8
Temporary Visas	23.2	22.4	17.0	9.2	8.2	8.6	14.5	15.2
Agricultural Sciences (No.)	414	576	815	1,033	925	1,150	1,258	1,252
Permanent Visas	3.9	3.5	5.2	8.9	3.6	4.2	3.9	4.8
Temporary Visas	22.0	30.2	28.1	28.3	34.1	34.7	33.1	35.6
SOCIAL SCIENCES† (No.)	1,668	2,327	3,984	5,758	6,073	6,142	5,765	5,955
Permanent Visas	3.0	3.6	4.1	4.2	3.2	3.3	3.8	4.2
Temporary Visas	9.0	10.1	8.4	9.2	9.2	9.1	12.2	15.5
Political Sci./Int'l Relations (No.)	238	391	558	908	710	532	484	524
Permanent Visas	2.6	4.7	6.3	4.2	5.2	5.7	5.4	9.3
Temporary Visas	12.6	15.0	9.1	10.6	11.8	13.5	20.7	25.2
Economics (No.)	352	560	708	943	840	825	812	898
Permanent Visas	6.3	5.7	7.0	8.5	5.5	7.6	7.7	6.8
Temporary Visas	19.0	20.4	16.9	20.9	25.8	25.9	35.9	40.8
HUMANITIES (No.)	1,600	2,530	3,788	5,414	4,562	3,751	3,429	3,558
Permanent Visas	3.0	3.0	4.5	4.4	3.6	4.2	4.6	6.4
Temporary Visas	3.0	4.7	3.8	4.7	4.9	6.5	8.1	10.5
EDUCATION (No.)	1,549	2,736	4,659	7,238	7,455	7,497	6,733	6,265
Permanent Visas	0.5	1.0	1.5	1.5	1.5	1.8	2.0	2.8
Temporary Visas	4.7	4.5	4.2	4.1	5.2	7.4	8.8	7.6
PROFESSIONAL/OTHER† (No.)	241	439	838	1,503	1,684	1,658	1,894	2,202
Permanent Visas	0.8	4.4	4.9	4.8	4.6	4.8	5.4	6.3
Temporary Visas	10.1	12.1	9.3	11.3	11.5	13.0	17.9	19.8
Business and Management (No.)	140	287	516	785	671	624	790	1,071
Permanent Visas	0.7	4.6	5.8	5.1	6.1	8.3	8.7	6.9
Temporary Visas	5.8	10.6	8.1	13.0	15.8	15.6	22.6	26.5

NOTE: Totals in each field include U.S. citizens and recipients with unknown citizenship status. Percentages are based on the number of doctorates with known citizenship status. See Technical Notes in Appendix C for rates of nonresponse to this question.

*Computer Sciences was not available prior to 1979.
†Totals include other fields not shown.

Table 18 Top Five Countries of Origin of Non-U.S. Citizen Doctorate Recipients, by Broad Field, 1964, 1973, and 1989 (ranked on number of Ph.D.s)

	1964		1973		1989	
Field	Country	Number	Country	Number	Country	Number
Physical Sciences*	1. India	80	1. Taiwan, Rep. of China†	226	1. People's Rep. of China	318
	2. Taiwan, Rep. of China†	54	2. India	154	2. Taiwan, Rep. of China	217
	3. Canada	46	3. Canada	81	3. Republic of Korea§	167
	4. Republic of Korea§	24	4. England	36	4. India	162
	5. England	19	5. Hong Kong	31	5. Canada	50
Engineering	1. Taiwan, Rep. of China†	65	1. India	267	1. Taiwan, Rep. of China	421
	2. India	52	2. Taiwan, Rep. of China†	199	2. Republic of Korea§	307
	3. Canada	30	4. Arab Rep. of Egypt	42	3. India	251
	4. Arab Rep. of Egypt	21	5. Japan	41	4. People's Rep. of China	152
	5. England	13	3. [redacted] KOREA	[redacted] 44	5. Iran	108
Life Sciences	1. India	116	1. India	150	1. Taiwan, Rep. of China	148
	2. Canada	64	2. Taiwan, Rep. of China†	131	2. People's Rep. of China	121
	3. Taiwan, Rep. of China†	30	3. Canada	103	3. India	107
	4. Arab Rep. of Egypt	29	4. England	39	4. Republic of Korea§	106
	5. Mexico	14	5. Thailand	27	5. Canada	77
Social Sciences	1. Canada	49	1. Canada	116	1. Republic of Korea§	170
	2. India	26	2. India	59	2. Taiwan, Rep. of China	70
	3. England	15	3. England	47	3. Canada	65
	4. Republic of Korea§	15	4. Israel	37	4. Japan	35
	5. Pakistan, Taiwan, Rep. of China†	13	5. [redacted] KOREA	[redacted] 32	5. India	35

Humanities	1. Canada	21	1. Canada	90	1. Canada	50
	2. India	15	2. England	34	2. Republic of Korea§	34
	3. England	12	3. West Germany#	31	3. England	33
	4. Taiwan, Rep. of China†	8	4. France	30	4. West Germany#	33
	5. Australia, Japan, West Germany#	7	5. Israel	19	5. Japan	28
Education	1. Canada	19	1. Canada	104	1. Canada	50
	2. India	12	2. India	22	2. Republic of Korea§	50
	3. The Philippines	12	3. England	21	3. Taiwan, Rep. of China	43
	4. Pakistan	11	4. Thailand	17	4. Thailand	40
	5. Arab Rep. of Egypt	10	5. Australia, Nigeria	15	5. Nigeria	37
Professional/ Other	1. Canada	11	1. Canada	39	1. Republic of Korea§	92
	2. Arab Rep. of Egypt	9	2. India	22	2. India	88
	3. India	9	3. Arab Rep. of Egypt	15	3. Taiwan, Rep. of China	49
	4. Taiwan, Rep. of China†	3	4. Israel	13	4. Canada	28
	5. The Philippines	3	5. England	12	5. England	14

NOTE: See Technical Notes in Appendix C for rates of nonresponse to the country of citizenship question. See Appendix Table B-3 for trend data on all countries.

*Includes mathematics and computer sciences.
†Includes "China, unspecified" in 1964 and 1973. It can be assumed that virtually all of these recipients are of Taiwanese citizenship because the People's Republic of China did not permit its citizens to study nonlanguage fields in the United States until after the signing of the Understanding on Educational Exchanges in the fall of 1978.
§Includes "Korea, unspecified." The Democratic People's Republic of Korea (North Korea) does not permit its citizens to study in the United States.
#Includes "Germany, unspecified." The German Democratic Republic (East Germany) did allow exchange students in the United States for partial preparation toward the Ph.D., but the degree was subsequently awarded by the home country institution. Virtually all German recipients of U.S. Ph.D.s have been West German.

Primary Source of Support

A comparison of data on Ph.D.s' primary sources of support during graduate school, as presented in Table 11 on page 26 and in Table 19, reveals a significantly different distribution for non-U.S. citizens than for the overall doctoral cohort. While almost identical percentages of the entire 1989 cohort received primary support from personal or university funds (about 41 percent each), 57 percent of non-U.S. Ph.D.s received their major support from the university and only 18 percent from personal funds. This lower percentage of personal support, however, masks differences between permanent and temporary residents. Only 15 percent of temporary residents indicated that they were mainly self-supporting, compared to 32 percent of permanent residents. Conversely, a larger proportion of temporary residents than permanent residents was primarily supported by the university (58 percent versus 53 percent).[15]

"Other" sources were reported by 16 percent of foreign recipients in 1989, three-fourths of whom indicated foreign governments as the major provider. Temporary residents, in particular, showed significant proportions with primary support from the home government: 14 percent of the group overall, and 30 percent of agriculture Ph.D.s. In comparison, only 5 percent of permanent residents reported this type of support. The U.S. government was responsible for the primary support of the remaining 9 percent of non-U.S. Ph.D.s., with a somewhat higher percentage for temporary residents (10 percent) than for permanent residents (8 percent).[16]

In six of the seven broad fields in 1989, the largest proportion of primary support for non-U.S. citizens (ranging from 48 percent in social sciences to 70 percent in physical sciences) was obtained from university sources, primarily teaching assistantships (TAs) and research assistantships (RAs). In contrast, only 29 percent of all primary support in education was supplied by the university, while 44 percent was obtained from personal sources and another 18 percent from foreign governments. Federal support of foreign Ph.D.s was highest in physical sciences (16 percent) and engineering (12 percent), with RAs the major mechanism of support (15 percent and 11 percent, respectively).[17] Among non-U.S. citizens, RAs funded by the National Science Foundation (NSF) were reported as the primary source of support by 9 percent of physical science Ph.D.s and 6 percent of engineering Ph.D.s. Nearly 10 percent of non-U.S. Ph.D.s in life sciences also indicated primary support from the federal government [7 percent through RAs, over half funded by the National Institutes of Health (NIH)]. Federal support was greater for Ph.D.s in biological sciences (13 percent) than in other life science subfields and was again granted mostly through RAs (10 percent total and 7 percent funded by NIH). Among "other" sources, foreign government support was highest in life sciences (19 percent), especially in agriculture (28 percent) and health sciences (20 percent). In addition, a significant 18 percent of education doctorates received their major support from foreign governments.

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[15]In general, Ph.D.s in physical sciences, life sciences, and engineering are largely supported by universities, while Ph.D.s in the other fields are more likely to be self-supporting. Because non-U.S. citizens are most concentrated in science and engineering fields, universities are their greatest provider. The reader is also referred to the discussion of support for the total cohort on page 25.

[16]Federal support may be understated because additional support provided through universities (such as research assistantships) may be included under "university."

[17]Eligibility requirements for U.S. government support declare that federally-funded fellowships can only be awarded to U.S. citizens and permanent residents, not to temporary residents. Also see footnote 16.

Table 19 Primary Sources of Support for Non-U.S. Citizen Doctorate Recipients, by Visa Status and Broad Field, 1989 (in percent)

Primary Source of Support	All Fields	Physical Sci.*	Engineering	Life Sci.	Social Sci.	Humanities	Education	Prof./Other
PERMANENT RESIDENTS								
Personal†	32.0	11.8	20.5	25.8	48.2	41.6	57.3	43.9
University	52.9	70.0	60.7	50.2	38.2	52.6	34.4	50.0
Teaching Assistantship	24.2	37.3	18.8	11.4	20.9	39.3	18.3	28.9
Research Assistantship	21.7	30.0	39.0	28.4	9.4	2.9	6.9	12.3
Fellowship	4.6	1.4	2.6	7.0	5.2	7.5	6.1	4.4
Other	2.3	1.4	0.3	3.5	2.6	2.9	3.1	4.4
Federal	8.2	15.5	12.0	13.1	3.7	1.7	0.8	0.0
Research Assistantship	6.3	14.1	11.4	7.0	1.6	0.6	0.0	0.0
Other§	1.9	1.4	0.6	6.1	2.1	1.2	0.8	0.0
Other	7.0	2.7	6.8	10.9	9.9	4.0	7.6	6.1
National Fellowship	0.7	0.0	0.3	1.3	1.6	0.6	0.8	0.0
Business/Industry	1.1	0.9	1.9	1.3	1.0	0.0	0.0	1.8
Foreign Government	4.5	1.8	3.9	8.3	5.8	2.3	5.3	4.4
Other	0.7	0.0	0.6	0.0	1.6	1.2	1.5	0.0
TEMPORARY RESIDENTS								
Personal†	14.7	5.3	9.8	11.5	25.2	24.0	38.8	27.5
University	57.5	70.1	61.9	52.4	50.5	56.4	27.4	53.3
Teaching Assistantship	23.2	36.0	17.0	11.6	29.2	36.7	11.9	28.3
Research Assistantship	27.3	29.7	41.4	31.1	9.8	2.2	9.0	15.3
Fellowship	5.4	3.7	2.6	7.3	9.0	14.9	2.9	7.9
Other	1.7	0.8	0.9	2.4	2.5	2.5	3.7	1.7
Federal	9.7	15.7	12.0	8.7	4.6	2.5	3.7	1.4
Research Assistantship	8.2	15.2	11.1	6.5	1.8	0.0	0.8	0.0
Other§	1.5	0.5	0.8	2.2	2.8	2.5	2.9	1.4
Other	18.1	8.9	16.4	27.4	19.6	17.1	30.1	17.8
National Fellowship	1.3	0.7	0.5	2.8	2.2	0.7	2.9	0.6
Business/Industry	1.1	0.6	1.5	0.9	1.0	0.7	1.6	1.4
Foreign Government	13.9	6.9	13.8	20.8	13.3	12.4	22.2	13.6
Other	1.8	0.7	0.6	3.0	3.1	3.3	3.4	2.3

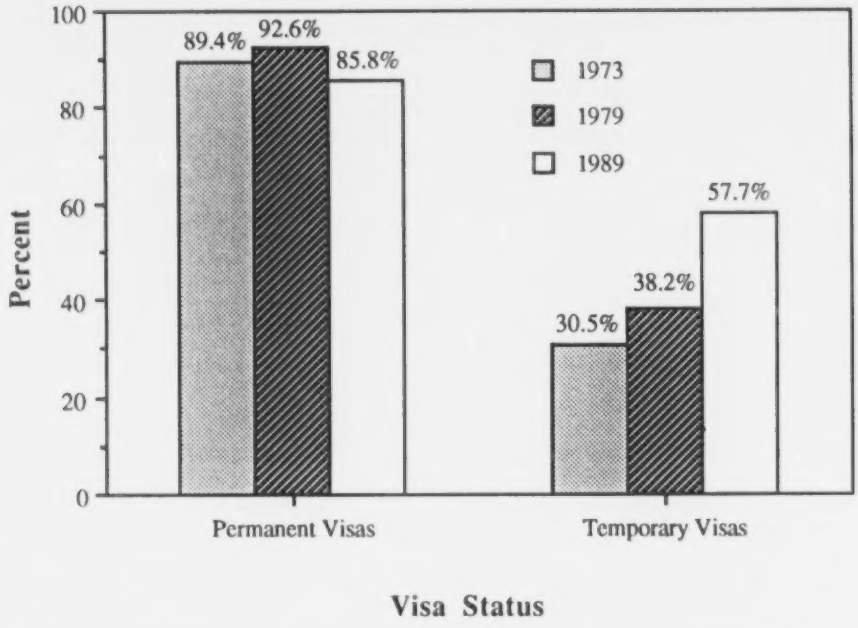
NOTE: The "primary" source of support is the source with the largest reported percentage. See Technical Notes in Appendix C for rates of nonresponse to this question.

*Includes mathematics and computer sciences.
†"Personal" includes all loans as well as earnings and contributions from the spouse/family.
§Includes traineeships and fellowships funded by major federal agencies, as well as support from the G.I. Bill and other miscellaneous sources. Federal loans are grouped under "Personal."

Postdoctoral Location and Plans

Doctorate recipients are asked to classify the status of their postgraduation plans as "definite" (a signed contract or other firm commitment for study or employment), "negotiating" (with one or more specific organizations), or "seeking" (with no specific prospects). Because recipients sometimes complete the questionnaire well ahead of graduation, it is not possible to determine the final status of the "negotiators" and "seekers." Therefore, the discussion of postdoctoral plans in the remaining sections of this report focuses only on those Ph.D.s who indicated "definite" commitments at the time of survey completion; in 1989, 58 percent of permanent residents and 64 percent of temporary residents reported "definite" plans. Also, because the questions on postgraduation plans were not consistent until the late 1960s, the years discussed in the remainder of the report are 1973, 1979, and 1989; 1979 is shown as the interim year because the greatest growth in doctorates awarded to non-U.S. citizens has occurred since that time.

Results of the survey indicate that not only are non-U.S. citizens earning larger numbers of doctorates in the United States, but they are also staying here more often after graduation (see Figure 10). In 1973, 51 percent (or 1,595) of foreign Ph.D.s with definite postgraduation plans planned to stay in the United States after graduation; by 1989, the proportion had grown to 63 percent (or 2,904 Ph.D.s). Among permanent residents, however, the proportion of Ph.D.s planning to stay in this country actually declined from



NOTE: See Technical Notes in Appendix C for rates of nonresponse to the applicable questions.

FIGURE 10 Percentage of non-U.S. citizen doctorate recipients with definite plans to remain in the United States after graduation, by visa status, 1973, 1979, and 1989.

89 percent to 86 percent between 1973 and 1989, and their numbers fell from 966 to 724 Ph.D.s. In striking contrast, the proportion of temporary visa-holders planning to stay in the United States rose from 31 percent to 58 percent, and their numbers more than tripled (from 629 to 2,180 Ph.D.s). Most of this increase occurred in the 1980s, with the surge in the number of doctorates awarded to temporary residents. In 1979, only 38 percent of temporary residents with definite commitments (or 877 Ph.D.s) indicated plans to stay in the United States after graduation.[18]

Table 20 presents an overview of the immediate postgraduation plans of permanent and temporary visa-holders with definite commitments, including location, type of commitment, and major field of doctorate. While, overall, foreign Ph.D.s planning to stay in the United States have been more inclined toward employment than study, temporary residents have been almost equally divided between the two. In fact, in 1989 there were more temporary resident Ph.D.s staying here to study (30 percent, or 1,137 Ph.D.s) than to work (27 percent, or 1,029 Ph.D.s). Because temporary visa-holders are generally not eligible to accept permanent jobs in this country, study opportunities may be more readily available to them. Among permanent visa-holders in 1989, 61 percent (or 508 Ph.D.s) reported employment commitments in the United States, and 25 percent (or 212 Ph.D.s) reported study commitments.

Table 20 also points out differences among the seven broad fields, as well as the subfields in which non-U.S. citizens are most concentrated. For both groups of non-U.S. citizens, the subfields of physics/astronomy, chemistry, and biological sciences show the largest shares of Ph.D.s with study plans in the United States. Among permanent visa-holders in 1989, 73 percent (or 29 Ph.D.s) reported U.S. study commitments in physics/astronomy, 60 percent (or 30 Ph.D.s) in chemistry, and 71 percent (or 84 Ph.D.s) in biological sciences. The proportions and numbers for temporary visa-holders were 70 percent (or 183 Ph.D.s) in physics/astronomy, 77 percent (or 226 Ph.D.s) in chemistry, and 62 percent (or 253 Ph.D.s) in biological sciences. Foreign recipients in other fields were disproportionately inclined towards employment in the United States: computer sciences (94 percent of permanent residents, or 30 Ph.D.s; 71 percent of temporary residents, or 77 Ph.D.s); business and management (88 percent of permanent residents, or 45 Ph.D.s; 64 percent of temporary residents, or 107 Ph.D.s); mathematics (70 percent of permanent residents, or 14 Ph.D.s; 41 percent of temporary residents, or 81 Ph.D.s); and engineering (77 percent of permanent residents, or 130 Ph.D.s; 39 percent of temporary residents, or 387 Ph.D.s).[19] Permanent residents holding degrees in earth/atmospheric/marine sciences, health sciences, social sciences, humanities, and education were also most likely to work in the United States. Temporary residents, too, reported more employment than study commitments in these fields, but most of the employed planned to return home. Only in agricultural sciences did both groups show the largest proportions with employment plans abroad (41 percent of permanent residents, or 11 Ph.D.s; 61 percent of temporary residents, or 146 Ph.D.s).

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[18]Last year's report compared the doctorate recipient's country of origin with the intended postgraduation location (see *Summary Report 1988*, page 35). The data revealed that, in general, citizens of the European and Asian continents, Canada, and the Caribbean Islands were more likely to remain in the United States after graduation, while citizens of Central and South America, Africa, and Australia were more likely to leave. Differences were observed, however, among countries within these regions.

[19]The reader should note that although the proportions of Ph.D.s in these fields were smaller for temporary residents than for permanent residents, the actual numbers of temporary residents employed in the United States were much larger.

Table 20 Postdoctoral Location of Non-U.S. Citizen Doctorate Recipients with Postgraduation Commitments, by Visa Status and Major Field, 1973, 1979, and 1989 (in percent)

Field	U.S. Employment			U.S. Study			Foreign Employment			Foreign Study		
	1973	1979	1989	1973	1979	1989	1973	1979	1989	1973	1979	1989
PERMANENT RESIDENTS												
Total All Fields (No.)	642	539	508	314	160	212	95	48	99	20	9	21
	59.9	71.3	60.5	29.3	21.2	25.2	8.9	6.3	11.8	1.9	1.2	2.5
Physical Sciences	37.7	60.3	47.5	52.1	35.1	43.0	5.6	3.3	5.1	4.7	1.3	4.4
Physics/Astronomy	26.9	54.1	15.0	58.2	37.8	72.5	6.0	5.4	2.5	9.0	2.7	10.0
Chemistry	31.0	43.9	34.0	65.5	54.4	60.0	1.2	0.0	4.0	2.4	1.8	2.0
Earth, Atmos., and Marine	47.1	72.2	50.0	41.2	22.2	37.5	11.8	5.6	6.3	0.0	0.0	6.3
Mathematics	70.0	78.6	70.0	13.3	14.3	15.0	10.0	7.1	10.0	6.7	0.0	5.0
Computer Sciences*	N/A	100.0	93.8	N/A	0.0	0.0	N/A	0.0	6.3	N/A	0.0	0.0
Engineering	70.4	88.5	76.5	20.0	8.3	15.9	8.9	2.8	7.6	0.7	0.5	0.0
Life Sciences	30.2	31.3	21.3	58.0	60.9	60.6	8.5	5.2	12.9	3.3	2.6	5.2
Biological Sciences	26.3	17.9	17.8	65.4	75.0	71.2	4.5	3.6	5.9	3.8	3.6	5.1
Health Sciences	50.0	75.0	70.0	43.8	25.0	10.0	6.3	0.0	20.0	0.0	0.0	0.0
Agricultural Sciences	37.5	60.0	18.5	35.0	20.0	33.3	25.0	20.0	40.7	2.5	0.0	7.4
Social Sciences†	81.9	78.9	72.3	6.9	10.1	10.7	11.1	9.2	17.0	0.0	1.8	0.0
Economics	84.0	84.6	80.6	4.0	7.7	3.2	12.0	7.7	16.1	0.0	0.0	0.0
Political Sci./Int'l Relations	81.8	71.4	75.0	4.5	0.0	0.0	13.6	28.6	25.0	0.0	0.0	0.0
Humanities	87.9	80.0	78.8	4.0	7.1	4.8	7.3	12.9	15.4	0.8	0.0	1.0
Education	64.6	82.2	66.1	10.4	2.2	6.5	25.0	13.3	22.6	0.0	2.2	4.8
Professional/Other†	87.5	83.7	83.5	6.3	4.1	2.5	6.3	12.2	11.4	0.0	0.0	2.5
Business and Management	89.3	93.5	88.2	3.6	0.0	3.9	7.1	6.5	7.8	0.0	0.0	0.0

TEMPORARY RESIDENTS

Total All Fields (No.)	317	470	1,029	311	400	1,137	1,250	1,257	1,371	167	124	217
	15.5	20.9	27.4	15.2	17.8	30.3	61.1	55.8	36.5	8.2	5.5	5.8
Physical Sciences	11.9	19.2	23.6	31.8	41.3	52.9	36.6	30.4	15.6	19.7	9.1	7.9
Physics/Astronomy	6.1	10.7	10.0	37.1	50.3	70.1	21.2	24.8	6.9	35.6	14.1	13.0
Chemistry	6.7	8.5	8.5	48.3	62.0	77.1	30.8	23.2	8.5	14.2	6.3	5.8
Earth, Atmos., and Marine	7.3	13.3	14.7	22.0	17.8	36.8	65.9	57.8	41.2	4.9	11.1	7.4
Mathematics	26.6	44.4	41.3	11.0	9.9	26.5	50.5	39.5	24.5	11.9	6.2	7.7
Computer Sciences*	N/A	66.7	70.6	N/A	9.5	3.7	N/A	23.8	23.9	N/A	0.0	1.8
Engineering	20.7	42.0	38.5	17.7	18.8	26.3	54.5	36.3	32.0	7.2	2.9	3.2
Life Sciences	5.0	4.4	7.7	20.3	23.6	44.5	64.8	66.1	39.5	9.9	6.0	8.3
Biological Sciences	5.6	3.6	5.2	30.6	42.1	62.2	49.1	46.7	24.8	14.8	7.6	7.9
Health Sciences	6.5	5.6	21.2	25.8	16.7	22.4	67.7	69.4	49.4	0.0	8.3	7.1
Agricultural Sciences	4.1	4.9	7.1	8.2	6.9	22.5	81.6	84.2	60.8	6.1	3.9	9.6
Social Sciences†	22.8	23.9	34.1	5.3	3.7	9.0	69.2	65.6	52.4	2.8	6.7	4.5
Economics	25.5	29.7	40.3	5.5	3.6	7.9	65.5	62.3	50.0	3.4	4.3	1.9
Political Sci./Int'l Relations	14.0	24.4	30.6	5.3	4.9	2.0	78.9	58.5	59.2	1.8	12.2	8.2
Humanities	25.3	15.8	34.4	4.0	2.5	1.5	68.4	76.7	56.4	2.3	5.0	7.7
Education	8.8	6.3	13.5	3.4	2.6	2.9	84.9	87.0	77.4	2.9	4.1	6.3
Professional/Other†	26.8	27.3	49.6	0.8	1.2	3.3	72.4	68.6	45.9	0.0	2.9	1.2
Business and Management	32.2	38.4	64.1	1.1	2.0	3.6	66.7	56.6	31.1	0.0	3.0	1.2

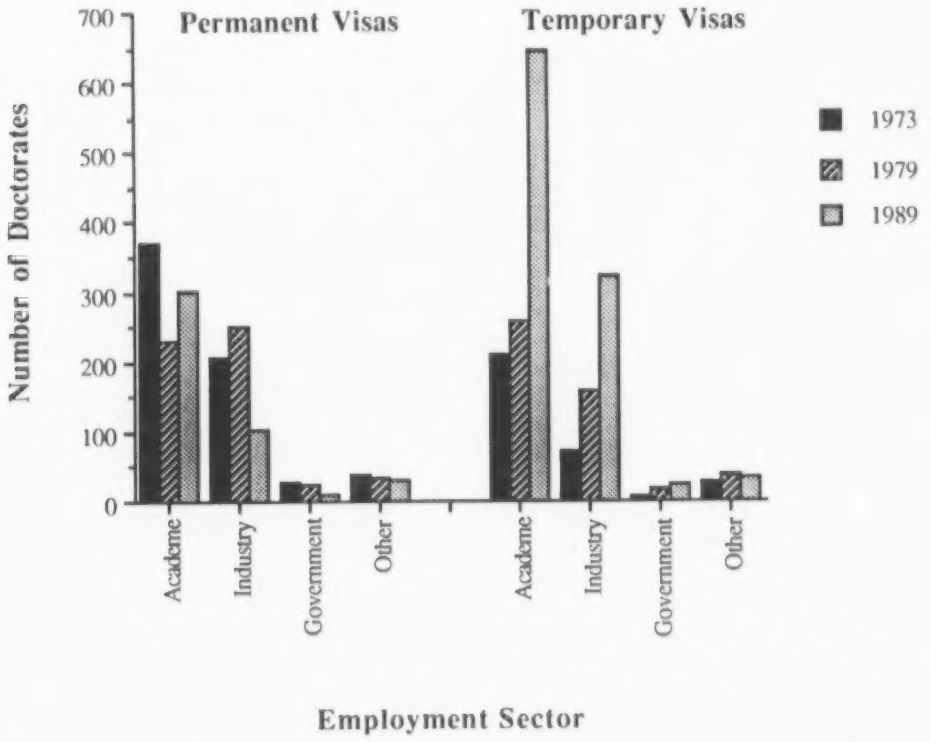
NOTE: Only doctorates with definite commitments are included. Percentages are based on the number of Ph.D.s with known postgraduation plans and location in each field. See Technical Notes in Appendix C for rates of nonresponse to these questions and for further explanation of postgraduation plans.

*Computer Sciences was not available prior to 1979.
†Totals include other fields not shown.

Employment Sector in the U.S. Labor Force

In 1989, 508 permanent resident Ph.D.s and 1,029 temporary resident Ph.D.s reported definite plans for employment in the United States after graduation.[20] As shown in Table 20 (pp. 48-49), these numbers represent 61 percent of all permanent visa-holders with definite plans and 27 percent of all temporary visa-holders. Figure 11 and Table 21 distribute these Ph.D.s among four employment sectors: academe, industry, government, and "other" (mainly nonprofit organizations and elementary/secondary schools). Table 21 also disaggregates the data by broad field of doctorate.

Through the years, academe and industry have been the major employers of foreign citizens working in this country after graduation. In 1989, academe was still the largest employer, hiring 60 percent of permanent residents (or 302 Ph.D.s) and 63 percent of temporary residents (or 646 Ph.D.s). Industry employed the second largest proportions:



NOTE: See Table 21 for numbers of doctorates and Technical Notes in Appendix C for rates of nonresponse to the applicable questions.

FIGURE 11 Number of non-U.S. citizen doctorate recipients in the U.S. labor force, by employment sector and visa status, 1973, 1979, and 1989.

[20]The reader is also referred to the description of postgraduation plans data located at the beginning of the "Postdoctoral Location and Plans" section on page 46.

32 percent of permanent visa-holders (or 164 Ph.D.s) and 31 percent of temporary visa-holders (or 321 Ph.D.s). The percentages of non-U.S. citizens in government and "other" sectors were much smaller. In all broad fields except engineering, the majority of both permanent and temporary residents in 1989 planned to work in academe. The highest percentages ranged from 86 to 94 percent in humanities and professional/other fields (with the numbers of Ph.D.s between 57 and 113). However, despite their smaller proportions, temporary residents in physical sciences, engineering, and social sciences outnumbered Ph.D.s in all other fields within the academic sector (153, 147, and 121 Ph.D.s, respectively).

Engineering Ph.D.s reported most of their commitments in industry (74 percent of permanent residents, or 96 Ph.D.s; 58 percent of temporary residents, or 223 Ph.D.s). The industrial sector also employed significant percentages of foreign Ph.D.s with degrees in physical and life sciences, although the numbers were quite small.

Table 21 also shows that the percentages of non-U.S. Ph.D.s with employment commitments in academe decreased substantially between 1973 and 1979 (especially among permanent residents) while there was a commensurate increase in industry. By 1989, though, the percentages of non-U.S. Ph.D.s planning to work in the academic sector were approximately the same as in 1973. The number of permanent visa-holders, nevertheless, remained smaller in 1989 than in 1973 (302 versus 369), with the most severe declines in social sciences and humanities. Their numbers also decreased in the other sectors, and in all but academe, there were still fewer permanent residents in 1989 than 10 years ago. These declines, of course, are reflective of the overall growth pattern of permanent visa-holders: after peaking in 1972, the doctorate production of permanent residents continued to fall into the mid-1980s; only in the past five years have they started to earn more degrees.

In contrast, temporary residents with employment commitments have exhibited substantial numerical growth in all sectors, regardless of the shifts in proportions from one year to the next. In U.S. academe, for example, the proportion of employed temporary resident Ph.D.s dropped from 67 percent in 1973 to 55 percent in 1979, then climbed to 63 percent by 1989. Despite these proportional fluctuations, the actual number of temporary visa-holders with commitments in the academic sector continued to rise; although the increase was small between 1973 and 1979, by 1989 the number had more than tripled (646 in 1989 versus 210 in 1973). During the same period, the number of temporary residents employed by industry increased 4.5 times, from 71 to 321 Ph.D.s. This tremendous growth, especially since 1979, was a direct result of the surge in doctorate production among temporary residents in the 1980s. It must be pointed out, however, that while new temporary resident Ph.D.s may outnumber new permanent resident Ph.D.s in the U.S. labor force, they are not permitted to remain indefinitely without a change in visa status.

Table 21 Employment Sector of Non-U.S. Citizen Doctorate Recipients with Postgraduation Commitments in the United States, by Visa Status and Broad Field, 1973, 1979, and 1989

Field		Academe			Industry/Self-Employment			Government			Other		
		1973	1979	1989	1973	1979	1989	1973	1979	1989	1973	1979	1989
PERMANENT RESIDENTS													
Total All Fields	(No.)	369	230	302	207	249	164	26	25	10	39	33	31
	(%)	57.6	42.8	59.6	32.3	46.4	32.3	4.1	4.7	2.0	6.1	6.1	6.1
Physical Sciences*	(No.)	32	27	39	33	59	34	12	3	0	3	2	2
	(%)	40.0	29.7	52.0	41.3	64.8	45.3	15.0	3.3	0.0	3.8	2.2	2.7
Engineering	(No.)	40	22	28	144	153	96	6	11	4	7	5	2
	(%)	20.3	11.5	21.5	73.1	80.1	73.8	3.0	5.8	3.1	3.6	2.6	1.5
Life Sciences	(No.)	30	17	19	21	13	12	2	1	1	11	4	0
	(%)	46.9	48.6	59.4	32.8	37.1	37.5	3.1	2.9	3.1	17.2	11.4	0.0
Social Sciences	(No.)	100	56	55	4	17	11	3	5	3	11	8	12
	(%)	84.7	65.1	67.9	3.4	19.8	13.6	2.5	5.8	3.7	9.3	9.3	14.8
Humanities	(No.)	105	48	77	1	3	2	0	0	1	3	5	2
	(%)	96.3	85.7	93.9	0.9	5.4	2.4	0.0	0.0	1.2	2.8	8.9	2.4
Education	(No.)	26	23	27	0	3	4	2	3	1	3	8	9
	(%)	83.9	62.2	65.9	0.0	8.1	9.8	6.5	8.1	2.4	9.7	21.6	22.0
Professional/Other	(No.)	36	37	57	4	1	5	1	2	0	1	1	4
	(%)	85.7	90.2	86.4	9.5	2.4	7.6	2.4	4.9	0.0	2.4	2.4	6.1

TEMPORARY RESIDENTS

Total All Fields	(No.)	210	256	646	71	157	321	6	17	23	29	39	36
	(%)	66.5	54.6	63.0	22.5	33.5	31.3	1.9	3.6	2.2	9.2	8.3	3.5
Physical Sciences*	(No.)	35	56	153	12	22	57	1	4	7	0	2	2
	(%)	72.9	66.7	69.9	25.0	26.2	26.0	2.1	4.8	3.2	0.0	2.4	0.9
Engineering	(No.)	19	73	147	47	115	223	2	9	11	1	9	5
	(%)	27.5	35.4	38.1	68.1	55.8	57.8	2.9	4.4	2.8	1.4	4.4	1.3
Life Sciences	(No.)	12	8	31	6	6	18	2	1	3	2	4	3
	(%)	54.5	42.1	56.4	27.3	31.6	32.7	9.1	5.3	5.5	9.1	21.1	5.5
Social Sciences	(No.)	62	51	121	3	7	8	0	1	2	16	19	20
	(%)	76.5	65.4	80.1	3.7	9.0	5.3	0.0	1.3	1.3	19.8	24.4	13.2
Humanities	(No.)	41	18	62	0	1	2	1	0	0	2	0	2
	(%)	93.2	94.7	93.9	0.0	5.3	3.0	2.3	0.0	0.0	4.5	0.0	3.0
Education	(No.)	13	10	19	0	1	5	0	2	0	5	3	4
	(%)	72.2	62.5	67.9	0.0	6.3	17.9	0.0	12.5	0.0	27.8	18.8	14.3
Professional/Other	(No.)	28	40	113	3	5	8	0	0	0	3	2	0
	(%)	82.4	85.1	93.4	8.8	10.6	6.6	0.0	0.0	0.0	8.8	4.3	0.0

NOTE: Only doctorates with definite commitments for employment in the United States are included; see Table 20 for percentages of permanent and temporary residents who meet these criteria. Percentages in Table 21 are based on the number of Ph.D.s with known employment sector in each field. See Technical Notes in Appendix C for rates of nonresponse to this question.

*Includes mathematics and computer sciences.

Work Activity in the U.S. Labor Force

Table 22 displays the primary work activities of foreign citizen Ph.D.s who reported employment commitments in the United States after graduation.[21] In 1989, 55 percent of temporary residents with definite employment commitments in this country (or 522 Ph.D.s) planned to work in research and development (R&D), while permanent residents were almost evenly divided between R&D (44 percent, or 204 Ph.D.s) and teaching (43 percent, or 203 Ph.D.s). Teaching was also the main work activity of 39 percent of temporary visa-holders (or 367 Ph.D.s). The proportions and numbers of recipients planning to work in other activities were quite small in comparison.

Disaggregation of the data by field reveals that, in 1989, teaching was the primary work activity of well over half of non-U.S. Ph.D.s in humanities, education, and professional/other fields. Ph.D.s in humanities were the most likely to teach (over 80 percent); many of these recipients held degrees in foreign languages. In both humanities and education, more permanent residents planned to teach (60 and 22 Ph.D.s, respectively) than temporary residents (51 and 15 Ph.D.s, respectively). In professional/other fields, however, temporary residents with teaching plans outnumbered permanent residents (62 versus 44 Ph.D.s). About 51 percent of temporary residents (or 71 Ph.D.s) and 45 percent of permanent residents (or 35 Ph.D.s) with doctorates in social sciences also indicated teaching as their primary activity. It should be pointed out that although physical sciences and engineering had smaller proportions of foreign Ph.D.s engaged in teaching, the numbers of temporary residents teaching in these fields were larger than in any other field (73 and 80 Ph.D.s, respectively).

R&D was the most frequently reported work activity in 1989 among non-U.S. Ph.D.s in the fields of physical sciences, engineering, and life sciences. Over 60 percent of temporary residents in each of these fields planned to conduct R&D: 124 Ph.D.s in physical sciences, 241 Ph.D.s in engineering, and 35 Ph.D.s in life sciences. Proportions of Ph.D.s working in R&D were also large for permanent visa-holders, but the numbers were much smaller than for temporary visa-holders: 47 Ph.D.s in physical sciences, 85 Ph.D.s in engineering, and 14 Ph.D.s in life sciences. Although R&D percentages were lower in social sciences than in the other sciences, the numbers of social science Ph.D.s engaged in R&D were higher than in life sciences (29 permanent residents and 57 temporary residents). There was also a significant amount of R&D activity reported by temporary resident Ph.D.s in professional/other fields (42 percent, or 48 Ph.D.s).

In 1989, teaching was the major activity in the academic sector for both permanent residents (68 percent, or 195 Ph.D.s) and temporary residents (60 percent, or 360 Ph.D.s). Within industry, R&D was the primary activity, reported by 77 percent of permanent visa-holders (or 113 Ph.D.s) and 83 percent of temporary visa-holders (or 248 Ph.D.s). R&D occupied significant proportions and numbers of foreign Ph.D.s in academe, as well: 26 percent of permanent residents (or 75 Ph.D.s) and 39 percent of temporary residents (or 234 Ph.D.s, almost as many as in industry).

As Table 22 shows, the distribution of foreign Ph.D.s among the various work activities has fluctuated over time. Because work activity is highly correlated with employment sector, proportional shifts among the activities tend to parallel proportional shifts among the sectors. Consequently, as the percentage of new Ph.D.s employed in the academic sector fell between 1973 and 1979, so did the percentage of new Ph.D.s planning to teach (from 50 to 32 percent of permanent visa-holders; from 52 to 42 percent of temporary visa-holders). Similarly, R&D activity increased when the industrial sector expanded. Between 1973 and 1979, the proportion of permanent residents performing

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[21]The reader is also referred to the description of postgraduation plans data located at the beginning of the "Postdoctoral Location and Plans" section on page 46.

Table 22 Primary Work Activity of Non-U.S. Citizen Doctorate Recipients with Employment Commitments in the United States, by Visa Status, Sector, and Broad Field, 1973, 1979, and 1989 (in percent)

	R&D			Teaching			Administration			Professional Services			Other		
	1973	1979	1989	1973	1979	1989	1973	1979	1989	1973	1979	1989	1973	1979	1989
PERMANENT RESIDENTS															
Total Ph.D.s (No.)	231	271	204	297	156	203	11	24	15	51	18	35	10	15	12
	38.5	56.0	43.5	49.5	32.2	43.3	1.8	5.0	3.2	8.5	3.7	7.5	1.7	3.1	2.6
Academe	14.0	22.7	26.1	84.0	71.6	67.9	1.1	3.3	2.8	0.9	1.4	2.4	0.0	0.9	0.7
Industry/Self-Employment	76.6	88.5	77.4	0.5	0.5	0.7	0.5	2.3	2.7	17.7	5.1	12.3	4.7	3.7	6.8
Government	73.7	68.0	40.0	0.0	4.0	10.0	0.0	24.0	10.0	21.1	0.0	40.0	5.3	4.0	0.0
Other	53.8	43.3	46.2	5.1	10.0	23.1	15.4	20.0	7.7	25.6	13.3	23.1	0.0	13.3	0.0
Physical Sciences*	58.3	80.0	68.1	36.1	14.1	26.1	1.4	0.0	2.9	2.8	1.2	1.4	1.4	4.7	1.4
Engineering	65.9	84.9	70.8	15.7	7.2	14.2	0.0	1.8	0.0	15.7	3.0	10.0	2.7	3.0	5.0
Life Sciences	51.8	74.2	48.3	30.4	12.9	24.1	3.6	3.2	3.4	10.7	9.7	17.2	3.6	0.0	6.9
Social Sciences	21.4	36.5	37.2	71.4	50.0	44.9	1.8	6.8	6.4	5.4	6.8	11.5	0.0	0.0	0.0
Humanities	4.7	5.7	9.3	90.6	79.2	80.0	1.9	1.9	2.7	1.9	3.8	5.3	0.9	9.4	2.7
Education	10.3	8.3	21.6	69.0	52.8	59.5	10.3	30.6	13.5	10.3	5.6	5.4	0.0	2.8	0.0
Professional/Other	15.0	15.4	23.0	72.5	76.9	72.1	2.5	7.7	0.0	7.5	0.0	3.3	2.5	0.0	1.6
TEMPORARY RESIDENTS															
Total Ph.D.s (No.)	112	208	522	157	180	367	8	9	6	18	20	39	9	9	17
	36.8	48.8	54.9	51.6	42.3	38.6	2.6	2.1	0.6	5.9	4.7	4.1	3.0	2.1	1.8
Academe	19.9	22.2	39.1	77.1	74.1	60.2	2.0	2.1	0.2	0.5	1.7	0.3	0.5	0.0	0.2
Industry/Self-Employment	77.1	85.7	82.7	0.0	0.7	1.3	2.9	2.1	0.3	12.9	7.9	11.7	7.1	3.6	4.0
Government	83.3	93.3	100.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0
Other	48.1	65.6	63.6	3.7	6.3	6.1	7.4	3.1	12.1	29.6	12.5	6.1	11.1	12.5	12.1
Physical Sciences*	53.2	47.3	62.6	46.8	44.6	36.9	0.0	0.0	0.0	0.0	4.1	0.5	0.0	4.1	0.0
Engineering	64.2	68.6	67.3	17.9	26.7	22.3	0.0	0.0	0.0	10.4	3.7	7.5	7.5	1.0	2.8
Life Sciences	63.6	56.3	66.0	27.3	31.3	28.3	4.5	0.0	0.0	4.5	6.3	1.9	0.0	6.3	3.8
Social Sciences	28.0	31.5	40.7	60.0	56.2	50.7	1.3	2.7	3.6	8.0	6.8	3.6	2.7	2.7	1.4
Humanities	4.7	0.0	16.4	90.7	94.1	83.6	0.0	5.9	0.0	0.0	0.0	0.0	4.7	0.0	0.0
Education	16.7	35.7	25.9	50.0	28.6	55.6	22.2	28.6	3.7	11.1	7.1	7.4	0.0	0.0	7.4
Professional/Other	12.5	12.2	42.1	75.0	73.2	54.4	6.3	4.9	0.0	6.3	7.3	2.6	0.0	2.4	0.9

NOTE: Only doctorates with definite commitments for employment in the United States are included; see Table 20 for percentages of permanent and temporary residents who meet these criteria. Percentages in Table 22 are based on the number of Ph.D.s with known employment sector and work activity in each field. See Technical Notes in Appendix C for rates of nonresponse to these questions.

*Includes mathematics and computer sciences.

R&D grew from 39 percent to 56 percent, and the proportion of temporary residents grew from 37 percent to 49 percent. By 1989, there was renewed teaching activity, and permanent residents were equally distributed between teaching and R&D. However, because of the overall decline in doctorate production among permanent residents beginning in 1973 and continuing into the mid-1980s, their numbers of Ph.D.s in both teaching and R&D were still fewer in 1989 than in 1973 (203 versus 297 in teaching and 204 versus 231 in R&D). The pattern for temporary residents was quite different: the percentage of temporary visa-holders reporting R&D activity increased between 1973 and 1979, while the percentage reporting teaching activity fell. Nevertheless, in every field, the number of temporary resident Ph.D.s continued to grow in teaching as well as in R&D. The total number of temporary visa-holders working in R&D rose from 112 Ph.D.s in 1973 to 208 Ph.D.s in 1979, and then soared to 522 Ph.D.s by 1989. Meanwhile, the number who planned to teach grew only slightly between 1973 and 1979 (from 157 to 180 Ph.D.s) but then doubled during the last decade, reaching 367 Ph.D.s in 1989. This upward trend in both teaching and R&D reflects the tremendous increase in the overall number of doctorates earned by temporary residents during the 1980s.

Summary

Between 1960 and 1989, the number of doctorates awarded to non-U.S. citizens increased sevenfold, from 1,176 to 8,195 Ph.D.s. By 1989, foreign nationals were receiving 26 percent of all Ph.D.s awarded in this country, compared to 12 percent in 1960. Most of this growth can be attributed to the influx of temporary residents studying for the Ph.D. during the last decade. While permanent visa-holders attained their peak level of doctorates in 1972 (2,093 Ph.D.s), temporary visa-holders increased their doctorate production in all but three years during the late 1970s. In 1989, temporary residents received 6,590, or 21 percent, of all doctorates granted in the United States.

The greatest concentration of non-U.S. citizens in 1989 was observed in engineering, where they accounted for 2,285, or 55 percent, of all doctoral degrees. Foreign nationals also earned 1,799 Ph.D.s in physical sciences, representing 36 percent of all doctorates in the field; their numbers were especially high in mathematics, physics/astronomy, and computer sciences.

Asian countries supplied the largest numbers of foreign students who received doctorates in 1989. Taiwan was the leading supplier with 962 Ph.D.s, but Korea and the People's Republic of China (PRC) have exhibited the most dramatic growth in recent years. Taiwan accounted for the largest number of non-U.S. Ph.D.s in engineering and life sciences. Korea led all other countries in social sciences and in professional/other fields, and the PRC ranked first in physical sciences. Canada showed the largest number of doctorates in humanities and education.

Colleges and universities provided the primary financial support during graduate school for 57 percent of non-U.S. citizens in 1989. The second most frequently reported source was personal funds (18 percent). "Other" sources were reported by an additional 16 percent of non-U.S. Ph.D.s, three-fourths of whom indicated foreign governments as the major provider. The remaining 9 percent of foreign Ph.D.s were primarily supported by the U.S. government.

Of the non-U.S. citizens who reported firm postgraduation plans in 1989, 63 percent (or 2,904 Ph.D.s) expected to remain in the United States at least temporarily, compared to 51 percent (or 1,595 Ph.D.s) in 1973. Temporary residents with U.S. commitments were somewhat more inclined to continue their education, while permanent residents were more likely to be employed. Academe was the largest employer of foreign Ph.D.s who planned to work here in 1989, hiring at least 60 percent of both permanent and temporary visa-holders. The industrial sector employed over 30 percent of each group. The majority of non-U.S. Ph.D.s in all fields but engineering planned to work in academe;

engineers were more likely to find positions in industry. In 1989, more than half of U.S.-employed temporary visa-holders planned to conduct R&D, while permanent visa-holders were almost evenly divided between R&D and teaching. Teaching was the most frequently reported activity in the academic sector, indicated by 68 percent of permanent residents and 60 percent of temporary residents. R&D was the primary activity in industry, reported by 77 percent of permanent residents and 83 percent of temporary residents. R&D was also reported by significant percentages of foreign Ph.D.s planning to work in the academic sector. Since 1973, the numbers of permanent resident Ph.D.s with definite postgraduation plans in the United States have decreased in all sectors, and in both teaching and R&D activities. The numbers of temporary residents, on the other hand, have continued to increase dramatically, multiplying 3 times in academe and 4.5 times in industry.

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APPENDIX A: The Seven Basic Tables, 1989

Table titles and headings are generally self-explanatory, but a few terms need special definition or explanation. The survey questionnaire is presented at the back of the report.

A-1 Number of Doctorate Recipients, by Gender and Subfield, 1989
A-2 Number of Doctorate Recipients, by Citizenship, Race/Ethnicity, and Subfield, 1989
A-3 Statistical Profile of Doctorate Recipients, by Major Field, 1989
A-4 Statistical Profile of Doctorate Recipients, by Race/Ethnicity and Citizenship, 1989
A-5 Sources of Graduate School Support for Doctorate Recipients, by Gender and Broad Field, 1989
A-6 State of Doctoral Institution of Doctorate Recipients, by Gender and Broad Field, 1989
A-7 Institutions Granting Doctorates, by Major Field, 1989

Tables A-1 and A-2: These tables display data for the most recent year by subfield of doctorate. The subfields correspond to the fields on the questionnaire's Specialties List located at the back of this report. Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates (SED). See inside the back cover for a description of field groupings as reported in these tables. The "general" field categories—e.g., "chemistry, general"—contain individuals who either received the doctorate in the general subject area or did not indicate a particular specialty field. The "other" field categories—e.g., "chemistry, other"—include individuals whose specified doctoral discipline was not included among the specialty fields.

Table A-1 presents data by doctoral specialty and gender. Table A-2 displays doctoral specialty by citizenship and race/ethnicity. See the explanatory note on Table A-4 for further description of the racial/ethnic variable and changes that have been made to the question over the years.

Table A-3: These are three 2-page tables: one contains data about all doctorate recipients in the most recent year, and the other two present data by gender. Field groupings may differ from those in reports published by federal sponsors of the SED. See inside the back cover for a description of field groupings as reported in these tables; see the questionnaire's Specialties List at the back of the report for the names and codes of the subfields included. Terms requiring definition are as follows:

- *Median Age at Doctorate*: One-half received the doctorate at or before this age. A recipient's age is derived by subtracting the year of birth from the calendar year of doctorate. Months are not included in the computation.
- *Percentage with Master's*: The percentage of doctorate recipients in a field who received a master's degree in any field before earning the doctorate.
- *Median Time Lapse*: "Total Time" refers to total calendar time elapsed between the year of baccalaureate and the year of doctorate; "Registered Time" refers to the total time registered in a university between baccalaureate and doctorate. Months are often not indicated by the recipient, and are, therefore, not included in the computation of time-to-doctorate.

Each year's doctorate recipients provide information on postgraduation employment or study plans in response to items 21 and 22 on the survey form. Since the questionnaire is filled out at about the time the doctorate is received, these planned activities can be subject to change. However, comparisons with data from the longitudinal Survey of Doctorate Recipients have shown these data to be a reasonable predictor of actual employment status in the year following the doctorate (see the discussion on "definite" postgraduation plans in the Technical Notes in Appendix C). Postgraduation plans of the doctorate recipients are grouped as follows: "Postdoctoral Study Plans" (fellowship, research associateship, traineeship, other), "Planned Employment" (educational institution, industry, etc.), or "Postdoctoral Status Unknown." The sum of these lines totals 100 percent for each column, with allowance for rounding: for example, 50.1 percent of all chemists had postdoctoral study plans, 41.1 percent planned to be employed, and 8.8 percent did not report their postgraduation plans; these total 100.0 percent. The study and employment rows are further subdivided—showing that 23.7 percent of all the chemists planned to pursue postdoctoral fellowships; 25.3 percent, research associateships; 0.4 percent, traineeships; and 0.7 percent, some other form of postdoctoral study. The employment row is similarly subdivided; the percentages, listed by type of employer, show that a total of 41.1 percent planned employment.

The four lines of data beginning with "Definite Postdoctoral Study" distinguish between individuals who have definite postgraduation plans (item 21: "Am returning to, or continuing in, predoctoral employment" or "Have signed contract or made definite commitment") and those who are still seeking employment or postdoctoral study (item 21: "Am negotiating with one or more specific organizations," "Am seeking position but have no specific prospects," or "Other"). These four lines, when added to the prior line, "Postdoctoral Status Unknown," total 100 percent with allowance for rounding. The two lines, "Definite Postdoctoral Study" and "Seeking Postdoctoral Study," add to give the percentage having "Postdoctoral Study Plans"; the two lines, "Definite Employment" and "Seeking Employment," add to give the percentage having "Planned Employment After Doctorate."

Percentages showing the distribution of doctorate recipients by work activity and by region of employment are based on those who have definite employment commitments. They exclude those still seeking employment and those planning postdoctoral study as described above.

Table A-4: Table A-4 contains data by race/ethnicity (first included in *Summary Report 1973*) and by citizenship for selected variables from Tables A-3 and A-5. Field groupings displayed may differ from those in reports published by federal sponsors of the SED. See inside the back cover for a description of field groupings as reported in these tables; see the questionnaire's Specialties List at the back of the report for the names and codes of the subfields included.

In 1977, the item on race/ethnicity in the survey questionnaire was revised to coincide with the question format recommended by the Federal Interagency Committee on Education and adopted by the Office of Management and Budget (OMB) for use in federally sponsored surveys; an explanation of the effect of these changes is detailed on page 13 of *Summary Report 1977*. Changes in the OMB guidelines prompted the moving of persons having origins in the Indian subcontinent from the white category to Asian in 1978. In 1980, two survey revisions were made: (1) the category Hispanic was subdivided into Puerto Rican, Mexican American, and "other" Hispanic to provide more detail for users of the racial/ethnic data, and (2) respondents were asked to check only one racial category (prior to 1980, doctorate recipients could check more than one category to indicate their race). However, when the data were compiled, all persons

who checked Asian, American Indian, or Hispanic and also checked white were included in the minority-group category; and those whose responses were black as well as any other category were designated as black.

Beginning with the 1982 survey, this item was revised to separate questions on racial and ethnic groups. Respondents are first asked to check one of the four racial group categories (American Indian, Asian, black, or white) and then to indicate Hispanic heritage. For purposes of analysis, all respondents who indicated Hispanic heritage, regardless of racial identification, are included in one of three Hispanic groups. The remaining survey respondents are then counted in the respective racial groups.

Table A-5: Table A-5 displays data reported in item 18 on all sources of financial support received during graduate school, by gender and broad field. Field groupings may differ from those in reports published by federal sponsors of the SED. See inside the back cover for a description of field groupings as reported in this table; see the questionnaire's Specialties List at the back of the report for the names and codes of the subfields included.

Doctorate recipients indicate multiple sources of support. In this table, a recipient counts once in each source category from which he or she received support. Federal support may be understated because additional support provided indirectly through universities is included under "university". The data should be interpreted as follows: 751 male doctorate recipients in the physical sciences reported financial support from National Science Foundation research assistantships during graduate school. This number is 18.8 percent of the male physical sciences doctorates who answered the question, and it is 53.3 percent of the males in all fields who reported NSF research assistantship support. Since students indicate multiple sources of support, the vertical percentages sum to more than 100 percent.

Table A-6: This table shows, by gender and broad field, the number of persons receiving a doctorate in the most recent year from institutions in each of the 50 states, the District of Columbia, and Puerto Rico. Field groupings may differ from those in reports published by federal sponsors of the SED. See inside the back cover for a description of field groupings as reported in this table; see the questionnaire's Specialties List at the back of the report for the names and codes of the subfields included.

Table A-7: This table displays data by doctorate-granting institution and major field. It includes all institutions in the 50 states, the District of Columbia, and Puerto Rico that awarded doctoral degrees in the most recent year. Field groupings may differ from those in reports published by federal sponsors of the SED and from departmental designations at institutions. See inside the back cover for a description of field groupings as reported in this table; see the questionnaire's Specialties List at the back of the report for the names and codes of the subfields included.

APPENDIX TABLE A-1 Number of Doctorate Recipients, by Gender and Subfield, 1989

Subfield of Doctorate	Number of Doctorates		
	Men	Women	Total
TOTAL ALL FIELDS	21809	12510	34319
PHYSICAL SCIENCES	4434	1026	5460
MATHEMATICS	705	156	861
Applied Mathematics	130	28	158
Algebra	40	10	50
Analysis/Functional Anal.	81	20	101
Geometry	40	7	47
Logic	7	5	12
Number Theory	18	5	23
Probability and Math Stat	129	38	167
Topology	29	8	37
Computing Theory/Practice	11	1	12
Operations Research	18	4	22
Mathematics, General	163	18	181
Mathematics, Other	39	12	51
COMPUTER SCIENCE	505	107	612
Computer Sciences	450	69	519
Information Sci & Systems	55	38	93
PHYSICS AND ASTRONOMY	1160	118	1278
Astronomy	41	8	49
Astrophysics	56	8	64
Acoustics	15		15
Atomic and Molecular	67	8	75
Electron	4		4
Elementary Particles	124	10	134
Fluids	13	1	14
Nuclear Structure	73	8	81
Optics	71	7	78
Plasma	57	4	61
Polymer	6	1	7
Solid State	274	23	297
Physics, General	251	20	271
Physics, Other	108	20	128
CHEMISTRY	1474	497	1971
Analytical	226	63	289
Inorganic	183	73	256
Nuclear	6		6
Organic	403	102	505
Pharmaceutical	43	22	65
Physical	222	87	309
Polymer	63	15	78
Theoretical	37	9	46
Chemistry, General	227	93	320
Chemistry, Other	64	33	97
EARTH, ATMOS & MARINE SCI	590	148	738
Atmos Physics and Chem	13	2	15
Atmospheric Dynamics	13	2	15
Meteorology	27		27
Atmos and Meteor. Sci, Gen	11	3	14
Atmos and Meteor. Sci, Oth	12	3	15
Geology	130	35	165
Geochemistry	26	13	39
Geophysics and Seismology	77	11	88
Paleontology	13	4	17
Mineralogy, Petrology	31	5	36
Stratigraphy, Sediment	18	6	24
Geomorph. and Glacial Geo	7	3	10
Applied Geology	5		5
Geological Sci, General	17	2	19
Geological Sci, Other	17	10	27
Environmental Sciences	48	20	68
Hydrology and Water Res	22	2	24
Oceanography	67	19	86
Marine Sciences	20	6	26
Physical Sciences, Other	16	2	18
ENGINEERING	4163	373	4536
Aerospace, Aero/Astronaut	169	8	177
Agricultural	96	6	102
Bioengineering and Biomed	89	26	115
Ceramic	31	4	35
Chemical	550	74	624
Civil	453	45	498
Communications	24	1	25
Computer	105	12	117
Electrical, Electronics	939	54	993
Engineering Mechanics	102	7	109
Engineering Physics	16		16
Engineering Science	24	3	27
Environmental Health Engineering	32	10	42
Industrial	143	18	161
Materials Science	223	34	257
Mechanical	626	22	648
Metallurgical	81	6	87
Mining and Mineral	29	4	33
Naval Architecture, Marine Eng	8	1	9
Nuclear	79	7	86
Ocean	18	2	20
Operations Research	54	13	67
Petroleum	28	1	29
Polymer	53	5	58
Systems Engineering	28	3	31
Engineering, General	62	2	64
Engineering, Other	101	5	106
LIFE SCIENCES	3917	2426	63
BIOLOGICAL SCIENCES	2572	1534	4106
Biochemistry	404	266	670
Biophysics	66	21	87
Bacteriology	9	3	12
Plant Genetics	15	3	18
Plant Pathology	14	8	22
Plant Physiology	32	15	47
Botany, Other	65	52	117
Anatomy	53	26	79
Biometrics and Biostatistics	26	20	46
Cell Biology	75	57	132
Ecology	125	37	162
Embryology	6	4	10
Endocrinology	11	10	21
Entomology	116	22	138
Immunology	91	61	152
Molecular Biology	255	152	407
Microbiology	217	123	340
Neurosciences	118	63	181
Nutritional Sciences	38	90	128
Parasitology	15	5	20
Toxicology	72	38	110
Human and Animal Genetics	55	57	112
Human and Animal Pathology	63	40	103
Human and Animal Pharmacology	140	98	238
Human and Animal Physiology	167	104	271
Zoology, Other	98	35	133
Biological Sciences, General	157	79	236
Biological Sciences, Other	69	45	114
HEALTH SCIENCES	347	638	985
Audiology and Speech Pathology	23	67	90
Environmental Health	27	8	35
Public Health	42	84	126
Epidemiology	44	64	108
Nursing	10	304	314
Pharmacy	74	37	111
Veterinary Medicine	36	13	49
Health Sciences, General	12	11	23
Health Sciences, Other	79	50	129
AGRICULTURAL SCIENCES	998	254	1252
Agricultural Economics	139	25	164
Animal Breeding and Genetics	20	3	23
Animal Nutrition	51	15	66
Dairy Science	15	1	16
Poultry Science	9	2	11
Fisheries Science	29	5	34
Animal Sciences, Other	70	25	95
Agronomy	120	20	140
Plant Breeding and Genetics	51	13	64
Plant Pathology	39	24	63
Plant Protection-Pest Mgmt	6	1	7
Plant Sciences, Other	11	4	15
Food Sciences	1		1
Food Engineering	10	1	11
Food Sciences, Other	94	53	147
Soil Sciences			
Soil Chemistry/Microbiology	21	7	28
Soil Sciences, Other	68	7	75
Horticulture Science	56	19	75

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix A.

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Subfield of Doctorate	Number of Doctorates		
	Men	Women	Total
Forestry Science			
Forest Biology	19	3	22
Forest Engineering	1		1
Forest Management	19	2	21
Wood Science	16		16
Renewable Natural Resources	11	1	12
Forestry & Related Sci, Other	49	8	57
Wildlife			
Wildlife/Range Management	42	10	52
Agriculture, General	5	2	7
Agriculture, Other	26	3	29
SOCIAL SCIENCES (INCL PSYCH)	3263	2692	5955
Anthropology	176	148	324
Area Studies	12	5	17
Criminology	24	10	34
Demography	12	9	21
Economics	701	171	872
Econometrics	24	2	26
Geography	80	25	105
International Relations	64	28	92
Political Science and Government	323	109	432
Public Policy Studies	49	28	77
Sociology	213	222	435
Statistics	49	20	69
Urban Studies	37	23	60
Social Sciences, General	17	8	25
Social Sciences, Other	73	84	157
PSYCHOLOGY	1409	1800	3209
Clinical	539	695	1234
Cognitive	46	33	79
Comparative	7	1	8
Counseling	215	283	498
Developmental	32	116	148
Experimental	76	69	145
Educational	45	61	106
Industrial and Organizational	55	47	102
Personality	11	17	28
Physiological	29	33	62
Psychometrics	3	3	6
Quantitative	5	6	11
School	38	69	107
Social	60	66	126
Psychology, General	173	224	397
Psychology, Other	75	77	152
HUMANITIES	1940	1618	3558
History, American	140	66	206
History, European	71	36	107
History of Science	10	9	19
History, General	54	33	87
History, Other	79	37	116
Classics	33	18	51
Comparative Literature	60	43	103
Linguistics	82	106	188
Speech and Debate	17	18	35
Letters, General	11	2	13
Letters, Other	22	37	59
American Studies	28	48	76
Archeology	12	15	27
Art History and Criticism	45	100	145
Music	353	175	528
Philosophy	204	67	271
Religion	174	41	215
Theatre	40	39	79
LANGUAGE AND LITERATURE	467	684	1151
American	89	104	193
English	212	316	528
French	24	81	105
German	28	45	73
Italian	9	11	20
Spanish	49	84	133
Russian	8	5	13
Slavic	3	4	7
Chinese	5	4	9
Japanese	6	7	13
Hebrew	6	5	11
Arabic	4	2	6
Other Languages	24	16	40
Humanities, General	11	9	20
Humanities, Other	27	35	62

Subfield of Doctorate	Number of Doctorates		
	Men	Women	Total
EDUCATION	2660	3605	6265
Curriculum and Instruction	294	542	836
Educational Admin and Supervision	847	773	1620
Educational Media	45	30	75
Educ. Statistics and Research	22	36	58
Educ. Testing, Eval and Meas	16	26	42
Educational Psychology	122	176	298
School Psychology	28	57	85
Social Foundations	51	61	112
Special Education	52	204	256
Student Counseling, Pers. Serv	110	158	268
Higher Education	162	207	369
Pre-elementary Education	12	51	63
Elementary Education	20	80	100
Secondary Education	28	25	53
Adult and Continuing Education	83	153	236
TEACHING FIELDS	429	542	971
Agricultural Education	28	7	35
Art Education	21	18	39
Business Education	15	25	40
English Education	16	35	51
Foreign Languages Education	12	22	34
Health Education	26	75	101
Home Economics Education	1	18	19
Industrial Arts Education	14	3	17
Mathematics Education	27	41	68
Music Education	63	35	98
Nursing Education		29	29
Physical Education	100	77	177
Reading Education	12	83	95
Science Education	26	22	48
Social Science Education	7	6	13
Speech Education	1		1
Technical Education	16	12	28
Trade and Industrial Education	33	14	47
Other Teaching Fields	11	20	31
Education, General	179	249	428
Education, Other	160	235	395
PROFESSIONAL/OTHER FIELDS	1432	770	2202
BUSINESS AND MANAGEMENT	792	279	1071
Accounting	124	60	184
Banking and Finance	129	23	152
Business Admin and Management	195	51	246
Business Economics	21	6	27
Marketing Management and Research	89	43	132
Business Statistics	11	4	15
Operations Research	45	7	52
Organizational Behavior	53	41	94
Business and Management, General	44	17	61
Business and Management, Other	81	27	108
COMMUNICATIONS	165	139	304
Communications Research	42	41	83
Journalism	7	8	15
Radio and Television	19	10	29
Communications, General	44	35	79
Communications, Other	53	45	98
OTHER PROFESSIONAL FIELDS	442	330	772
Architecture, Environmental Design	31	12	43
Home Economics	7	48	55
Law	21	5	26
Library and Archival Science	25	38	63
Public Administration	58	38	96
Social Work	77	132	209
Theology	194	38	232
Professional Fields, General			
Professional Fields, Other	29	19	48
OTHER FIELDS	33	22	55

SOURCE: National Research Council, Survey of Earned Doctorates.

APPENDIX TABLE A-2 Number of Doctorate Recipients, by Citizenship, Race/Ethnicity, and Subfield, 1989

Subfield of Doctorate	Total Doctorates	Non-U.S. Citizens Temp. Visas	U.S. Citizens and Non-U.S. with Permanent Visas								
				Race/Ethnicity							
			Total	Amer. Ind.	Asian	Black	White	Puerto Rican	Mexican Amer.	Other Hispanic	Other & Unk
TOTAL ALL FIELDS	34319*	6590	24777	93	1255	946	21354	174	173	333	449
PHYSICAL SCIENCES	5460	1531	3490	18	253	44	300	24	15	44	90
MATHEMATICS	861	343	428		24	8	369	4	2	5	16
Applied Mathematics	158	71	83		4	2	73				4
Algebra	50	20	30			1	21	1	1	3	3
Analysis/Functional Analysis	101	47	54		5	1	45			1	2
Geometry	47	19	28		2		23	2			1
Logic	12	6	6				5				1
Number Theory	23	6	17				17				
Probability/Math Statistics	167	67	91		7		82	1			1
Topology	37	13	24		2		22				
Computing Theory	12	3	9				9				
Operations Research	22	9	13				10			1	2
Mathematics, General	181	63	41		3	2	34		1		1
Mathematics, Other	51	19	32		1	2	28				1
COMPUTER SCIENCE	612	179	394	2	52	1	317			4	18
Computer Sciences	519	163	320	2	39		260			3	16
Information Sciences	93	16	74		13	1	57			1	2
PHYSICS AND ASTRONOMY	1278	427	735	5	59	5	627	4	1	11	23
Astronomy	49	9	36		2		31			1	2
Astrophysics	64	18	45	2			42	1			
Acoustics	15	3	12			1	11				
Atomic and Molecular	75	28	47	1	4		40				2
Electron	4	2	2				2				
Elementary Particles	134	43	91	1	3		83			3	1
Fluids	14	4	10		1		9				
Nuclear Structure	81	23	58		4		52				2
Optics	78	23	48		5		39			1	3
Plasma	61	19	41		2		37			1	1
Polymer	7	3	4		1		2				1
Solid State	297	121	175		24	2	138	1	1	4	5
Physics, General	271	91	92	1	8	2	74	2			5
Physics, Other	128	40	74		5		67			1	1
CHEMISTRY	1971	461	1376	5	95	26	1182	16	10	17	25
Analytical	289	59	230		7	2	214	2			5
Inorganic	256	53	202		12	3	177	2	4	1	3
Nuclear	6		6				6				
Organic	505	117	386	2	29	8	331	3	2	5	6
Pharmaceutical	65	10	54		4	4	44			1	1
Physical	309	81	228		22	5	188	6	1	5	1
Polymer	78	28	49		9		38		1	1	
Theoretical	46	18	28				27				1
Chemistry, General	320	75	120	2	11	3	92	1	1	2	8
Chemistry, Other	97	20	73	1	1	1	65	2	1	2	
EARTH, ATMOSPHERIC, MARINE SCI	738	121	557	6	23	4	507		2	7	8
Atmospheric Physics and Chem	15	4	11		2		8			1	
Atmospheric Dynamics	15	4	11	1	2		8				
Meteorology	27	5	18				18				
Atmos/Meteorological Sci, Gen	14	6	8				8				
Atmos/Meteorological Sci, Other	15	3	12		1		10				1
Geology	165	14	129		2	1	125				1
Geochemistry	39	6	28	1	1		26				
Geophysics and Seismology	88	20	60		4		51			3	2
Paleontology	17	1	16	1	1		13			1	
Mineralogy, Petrology	36	4	32		1		29			1	1
Stratigraphy, Sedimentation	24	3	21	1			19				1
Geomorphology & Glacial Geology	10		10		1		9				
Applied Geology	5	1	4				4				
Geological Sciences, General	19	8	10				10				
Geological Sciences, Other	27	6	20				20				
Environmental Sciences	68	8	57		3	2	52				
Hydrology and Water Resources	24	8	14				14				
Oceanography	86	12	64	1	4	1	53		2	1	2
Marine Sciences	26	6	20	1			19				
Physical Sciences, Other	18	2	12		1		11				
ENGINEERING	4536	1924	2214	7	358	32	1714	7	14	26	56
Aerospace, Aeronaut & Astronaut	177	83	82		9	1	70		1		1
Agricultural	102	39	58	1	4	2	48			1	2
Bioengineering and Biomedical	115	28	84		7	2	72	1	1	1	
Ceramic	35	13	20		3		16		1		
Chemical	624	188	406	1	66	3	320	1	4	3	8
Civil	498	248	219	1	32	4	168	2		6	6
Communications	25	10	15		1		13			1	
Computer	117	65	45		8		36				1

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix A.

*Includes 2,952 individuals who did not report their citizenship at time of doctorate.

Subfield of Doctorate	Total Doctorates	Non-U.S. Citizens Temp. Visas	U.S. Citizens and Non-U.S. with Permanent Visas								
				Race/Ethnicity							
			Total	Amer. Ind.	Asian	Black	White	Puerto Rican	Mexican Amer.	Other Hispanic	Other & Unk
Electrical, Electronics	993	422	473		83	9	352		3	9	17
Engineering Mechanics	109	51	46		7	1	35				3
Engineering Physics	16	5	11		1		10				
Engineering Science	27	13	12				10			1	1
Environmental Health Engr.	42	12	26		3		22		1		
Industrial	161	90	59		12	2	44				1
Materials Science	257	104	128	3	22		100				3
Mechanical	648	304	277		59	4	204	3			7
Metallurgical	87	35	45	1	9		34				1
Mining and Mineral	33	17	15		3	1	11				
Naval Archit., Marine Eng	9	6	2				2				
Nuclear	86	36	36		3		31		1	1	
Ocean	20	7	7				7				
Operations Research	67	35	31		2		27			1	1
Petroleum	29	13	12		4	1	7				
Polymer	58	33	25		6	1	17			1	
Systems Engineering	31	7	20		3		14			1	2
Engineering, General	64	19	21		4		16		1		
Engineering, Other	106	41	39		7	1	28		1		2
LIFE SCIENCES	6343	1142	4764	12	246	99	4206	30	25	49	97
BIOLOGICAL SCIENCES	4106	599	3277	7	198	52	2887	19	12	41	61
Biochemistry	670	126	518	1	43	6	446	3	2	6	11
Biophysics	87	19	63		5	3	53				2
Bacteriology	12	2	10				10				
Plant Genetics	18	8	10				9				1
Plant Pathology	22	3	19				19				
Plant Physiology	47	8	39		1		33	3			2
Botany, Other	117	18	91		3		86			1	1
Anatomy	79	7	65		2	1	60			1	1
Biometrics and Biostat	46	5	40		10	1	26	1			2
Cell Biology	132	12	117		6	2	104		2		3
Ecology	162	24	135		2	1	128		1	1	2
Embryology	10	1	9				9				
Endocrinology	21	8	13		1		12				
Entomology	138	24	110		3	3	103	1			
Immunology	152	11	136		12	2	117	2		2	1
Molecular Biology	407	71	330		32	2	281	2	2	4	7
Microbiology	340	52	264		16	7	233	2		4	2
Neurosciences	181	19	158		5	2	142	1	1	4	3
Nutritional Sciences	128	24	93	1	8	5	74			3	2
Parasitology	20	7	13				12			1	
Toxicology	110	5	97		1	1	92			1	2
Human and Animal Genetics	112	11	86		7	1	76			1	1
Human and Animal Pathology	103	11	89	1	7	3	75		1		2
Human and Animal Pharmacology	238	28	193	1	11	4	171			3	3
Human and Animal Physiology	271	30	228	1	8	2	204	1	2	4	6
Zoology, Other	133	12	113	1	3	1	104			3	1
Biological Sciences, General	236	41	151	1	6	1	133	2	1	2	5
Biological Sciences, Other	114	12	87		6	4	75	1			1
HEALTH SCIENCES	985	134	747	3	22	28	675	4	5	2	8
Audiology & Speech Pathology	90	7	79	1	1	5	70				2
Environmental Health	35	4	28		1	1	25				1
Public Health	126	17	99			6	87	1	2	2	1
Epidemiology	108	19	83	1	5	4	73				
Nursing	314	12	271		3	8	258		1		1
Pharmacy	111	42	55		8	1	42	2			2
Veterinary Medicine	49	14	30	1	1		28				
Health Sciences, General	23	6	7			1	6				
Health Sciences, Other	129	13	95		3	2	86	1	2		1
AGRICULTURAL SCIENCES	1252	409	740	2	26	19	644	7	8	6	28
Agricultural Economics	164	54	89		3	5	74		2	1	4
Animal Breeding and Genetics	23	10	12				12				
Animal Nutrition	66	14	52			2	47		1	1	1
Dairy Science	16	4	9				8	1			
Poultry Science	11	5	5				4				1
Fisheries Science	34	13	19		1		17				1
Animal Sciences, Other	95	25	63		2		58		2		1
Agronomy	140	48	85		3		73	1	2	1	5
Plant Breeding and Genetics	64	16	43	1	1	2	37				2
Plant Pathology	63	22	34		1	1	28	1		2	1
Plant Protection-Pest Mgmt	7	2	5				4				1
Plant Sciences, Other	15	7	8		1		6		1		
Food Sciences	1		1				1				
Food Engineering	11	9	2		1		1				
Food Sciences, Other	147	62	72		9	1	59	1			2
Soil Sciences											
Soil Chemistry/Microbiology	28	8	20		1		17				2
Soil Sciences, Other	75	34	36			1	33	1			1
Horticulture Science	75	17	52		1	2	46	1			2

APPENDIX TABLE A-2 (Continued)

Subfield of Doctorate	Total Doctorates	Non-U.S. Citizens Temp. Visas	U.S. Citizens and Non-U.S. with Permanent Visas								
				Race/Ethnicity							
			Total	Amer. Ind.	Asian	Black	White	Puerto Rican	Mexican Amer.	Other Hispanic	Other & Unk
Forestry Science											
Forest Biology	22	4	18			1	16				1
Forest Engineering	1	1									
Forest Management	21	5	16				16				
Wood Science	16	10	6		1		5				
Renewable Natural Resources	12	4	7				6				1
Forestry & Related Sci, Other	57	15	30		1	1	25			1	2
Wildlife											
Wildlife/Range Management	52	7	42				41	1			
Agriculture, General	7	2	4			1	3				
Agriculture, Other	29	11	10	1		2	7				
SOCIAL SCIENCES (INCL PSYCH)	5955	811	4417	18	135	188	3863	34	42	68	69
Anthropology	324	31	264	1	4	6	234	2	7	4	11
Area Studies	17	1	11	1			8				2
Criminology	34	1	29			5	23				1
Demography	21	6	14			1	12			1	
Economics	872	313	470	1	35	11	400	5	1	6	11
Econometrics	26	17	9			1	7			1	
Geography	105	27	69		3	3	62				1
International Relations	92	27	59		1	8	47	1		2	
Political Science and Gov't	432	90	288	1	16	17	243		2	3	6
Public Policy Studies	77	13	62		2	4	56				
Sociology	435	92	306	1	13	26	240	5	7	10	4
Statistics	69	41	20		1		18				1
Urban Studies	60	22	30		1	5	24				
Social Sciences, General	25	2	18	1	1	1	14		1		
Social Sciences, Other	157	25	116	1	3	5	101	1		2	3
PSYCHOLOGY	3209	103	2652	11	55	95	2374	20	29	39	29
Clinical	1234	11	1021	2	23	44	895	9	17	21	10
Cognitive	79	10	69		2	1	65				1
Comparative	8	1	6				6				
Counseling	498	9	470	4	6	15	431	1	4	5	4
Developmental	148	10	137	1	1	3	130	1		1	
Experimental	145	8	135		3	4	126			1	1
Educational	106	10	82		1	3	76		1	1	
Industrial & Organizational	102	6	95			2	89	1			3
Personality	28	4	24		1	1	21		1		
Physiological	62	1	61	1	2	2	55			1	
Psychometrics	6		6				6				
Quantitative	11	1	10		3		6			1	
School	107	2	98			4	86	2	1	3	2
Social	126	16	110	1	4	5	96				4
Psychology, General	397	6	206	2	9	6	173	5	4	3	4
Psychology, Other	152	8	122			5	113	1	1	2	
HUMANITIES	3558	342	2929	7	84	81	2583	23	23	62	66
History, American	206	13	193	1	1	8	172	1	4		6
History, European	107	4	103		1		99			1	2
History of Scienc	19	3	15				14			1	
History, General	87	16	45		1		40		2	1	1
History, Other	116	16	98		12	10	68	1	1	3	3
Classics	51	1	48		1		47				
Comparative Literature	103	20	75		2	1	64		1	3	4
Linguistics	188	56	111		6	4	95	1		3	2
Speech and Debate	35	2	33		1	3	28	1			
Letters, General	13		11				11				
Letters, Other	59	1	55	1	1	1	48	1		2	1
American Studies	76	3	68		1	6	57		1	2	1
Archeology	27	1	24				23			1	
Art History and Criticism	145	11	127		5		114	2		2	4
Music	528	49	408		20	9	374		4		1
Philosophy	271	36	208	1	3	5	186		2	3	8
Religion	215	15	187		4	5	174	2			2
Theatre	79	5	71		4	1	63				3
LANGUAGE AND LITERATURE	1151	86	983	3	17	25	851	14	8	38	27
American	193	8	178	1	1	10	158		1	3	4
English	528	31	455	2	10	5	416	1	3	3	15
French	105	7	90		1	5	78			3	3
German	73	10	58				56				2
Italian	20	4	13				13				
Spanish	133	15	111			4	63	12	3	29	
Russian	13		13				13				
Slavic	7	1	6				5				1
Chinese	9		9		2		7				
Japanese	13	2	11		3		8				
Hebrew	11		9				8	1			
Arabic	6	2	3				3				
Other Languages	40	6	27			1	23		1		2
Humanities, General	20		15				13			1	1
Humanities, Other	62	4	51	1	4	3	42			1	

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix A.

Subfield of Doctorate	Total Doctorates	Non-U.S. Citizens Temp. Visas	U.S. Citizens and Non-U.S. with Permanent Visas								
				Race/Ethnicity							
			Total	Amer. Ind.	Asian	Black	White	Puerto Rican	Mex-ican Amer.	Other His-panic	Other & Unk
EDUCATION	6265	443	5356	24	100	430	4590	51	47	66	48
Curriculum and Instruction	836	48	749	5	14	50	650	13	5	8	4
Educ. Admin and Supervision	1620	62	1511	8	13	147	1292	8	11	17	15
Educational Media	75	18	56		3		52				1
Educ. Statistics and Research	58	9	46		3	2	39		1	1	
Educ. Testing, Eval and Meas	42	12	27		2		24			1	
Educational Psychology	298	25	262		3	10	240	2	1	2	4
School Psychology	85		82	1		3	72	2	2	2	
Social Foundations	112	15	91		3	8	75	2	1	1	1
Special Education	256	13	238	2	4	16	208	2	2	3	1
Student Counseling/Pers. Serv	268	8	248	5	4	25	208	2		3	1
Higher Education	369	19	326		4	37	273		2	8	2
Pre-elementary Education	63	6	43		1	4	34	1		2	1
Elementary Education	100	5	84		2	10	68		1	1	2
Secondary Education	53	3	45			1	40	1		3	
Adult and Continuing Educ.	236	10	217	2	3	9	194	1	3	3	2
TEACHING FIELDS	971	119	821		20	65	704	11	10	8	6
Agricultural Education	35	8	27			7	15	1	3	1	
Art Education	39	5	32		4	4	22			1	1
Business Education	40	4	35			4	30	1			
English Education	51	8	42			5	35	1	1		
Foreign Languages Education	34	6	27		1		21	3	2		
Health Education	101	5	91		1	7	81		1		1
Home Economics Education	19	1	17		1	2	13				1
Industrial Arts Education	17		15			1	14				
Mathematics Education	68	8	59		5	8	45				1
Music Education	98	7	88		2	8	77		1		
Nursing Education	29	1	28		1	2	25				
Physical Education	177	33	138		1	8	126	1		1	1
Reading Education	95	8	83		1	4	75	1	1	1	
Science Education	48	7	40		2	1	35	2			
Social Science Education	13	2	11			1	8	1		1	
Speech Education	1		1				1				
Technical Education	28	4	23		1	2	20				
Trade and Industrial Education	47	10	37			1	35		1		
Other Teaching Fields	31	2	27				26				1
Education, General	428	34	222	1	14	22	172	2	4	3	4
Education, Other	395	37	288		7	21	245	4	4	3	4
PROFESSIONAL/OTHER FIELDS	2202	397	1607	7	79	72	1396	5	7	18	23
BUSINESS AND MANAGEMENT	1071	262	727	1	49	16	636	1	2	7	15
Accounting	184	29	152		6	4	140				2
Banking and Finance	152	56	93		15	2	72	1		2	1
Business Admin and Mgmnt	246	60	133		8	3	117			1	4
Business Economics	27	5	20		1	2	17				
Marketing Mgmnt and Research	132	33	95		5		85		1	1	3
Business Statistics	15	8	7				7				
Operations Research	52	21	31		4		27				
Organizational Behavior	94	9	85		1	3	76		1	1	3
Business and Mgmnt, General	61	8	39		5		33				1
Business and Mgmnt, Other	108	33	72	1	4	2	62			2	1
COMMUNICATIONS	304	32	249	1	5	20	211	2	1	4	5
Communications Research	83	10	73		3	4	64	1			1
Journalism	15	2	11			2	8				1
Radio and Television	29	6	22			5	14			3	
Communications, General	79	7	63	1		4	54	1	1	1	1
Communications, Other	98	7	80		2	5	71				2
OTHER PROFESSIONAL FIELDS	772	92	596	5	23	34	518	2	4	7	3
Architecture, Environ. Design	43	14	22		3		19				
Home Economics	55	12	41		2	1	37				1
Law	26	13	8			1	6			1	
Library and Archival Science	63	10	49		3	2	44				
Public Administration	96	11	62	1	1	8	51		1		
Social Work	209	10	176	1	4	18	148	1		4	
Theology	232	16	199	2	8	4	179	1	3	1	1
Professional Fields, General											
Professional Fields, Other	48	6	39	1	2		34			1	1
OTHER FIELDS	55	11	35		2	2	31				

SOURCE: National Research Council, Survey of Earned Doctorates.

APPENDIX TABLE A-3 Statistical Profile of Doctorate Recipients, by Major Field, 1989

Total All Doctorates

		1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos. and Marine Sci.	Mathematics	Computer Sciences	PHYSICAL SCIENCES	ENGINEERING	Biochemistry	Other Biosciences	Biosciences Subtotal	Health Sciences	Agricultural Sciences	LIFE SCIENCES
Number in Field		34319	1278	1971	738	861	612	5460	4536	670	3436	4106	985	1252	6343
Male	%	63.5	90.8	74.8	79.9	81.9	82.5	81.2	91.8	60.3	63.1	62.6	35.2	79.7	61.8
Female		36.5	9.2	25.2	20.1	18.1	17.5	18.8	8.2	39.7	36.9	37.4	64.8	20.3	38.2
U.S. Citizenship	%	67.5	52.7	65.6	71.4	45.6	55.1	59.0	40.9	72.2	76.1	75.5	73.3	54.7	71.1
Non-U.S., Permanent Visa		4.7	4.9	4.3	4.1	4.1	9.3	4.9	8.0	5.1	4.2	4.3	2.5	4.4	4.1
Non-U.S., Temporary Visa		19.2	33.4	23.4	16.4	39.8	29.2	28.0	42.4	18.8	13.8	14.6	13.6	32.7	18.0
Unknown		8.6	9.1	6.8	8.1	10.5	6.4	8.0	8.8	3.9	5.9	5.6	10.6	8.2	6.9
Married	%	56.3	47.7	52.5	55.4	47.6	56.9	51.5	58.4	53.6	53.7	53.7	57.1	62.8	56.0
Not Married		33.8	42.3	39.7	35.2	40.3	34.8	39.2	31.5	42.1	38.9	39.5	31.4	27.6	35.9
Unknown		9.9	9.9	7.9	9.3	12.1	8.3	9.3	10.1	4.3	7.3	6.8	11.6	9.7	8.1
Median Age at Doct.	Yrs	33.8	30.0	29.1	32.2	30.7	32.0	30.2	31.1	29.7	31.5	31.2	36.6	33.3	32.2
Percent with Bacc. in Same Field as Doctorate	%	54.2	73.2	80.2	51.5	68.5	20.8	66.2	76.2	24.8	57.7	52.4	48.3	60.9	53.4
Percent with Masters	%	76.8	61.8	34.8	74.4	73.1	82.7	57.9	84.8	28.4	49.4	45.9	81.8	90.0	60.2
Median Time Lapse From Bacc. to Doct.															
Total Time	Yrs	10.5	7.2	6.4	9.2	7.8	9.0	7.3	8.1	7.2	8.5	8.2	13.3	10.1	9.1
Registered Time		6.9	6.4	5.5	6.9	6.2	6.5	6.1	6.0	6.0	6.6	6.5	7.2	6.4	6.5
Postdoctoral Study Plans	%	22.7	58.9	50.1	38.5	23.3	9.8	41.8	19.4	79.7	65.8	68.1	13.3	26.7	51.4
Fellowship		11.3	20.7	23.7	17.2	10.7	3.6	17.8	5.8	50.4	39.8	41.5	7.2	8.5	29.7
Research Assoc.		9.0	36.1	25.3	20.6	9.4	5.1	22.4	11.7	22.1	18.4	19.0	4.3	16.7	16.3
Traineeship		1.0	1.3	0.4	0.4	2.2	0.5	0.9	1.4	1.6	1.6	1.6	0.6	1.2	1.4
Other Study		1.5	0.9	0.7	0.3	1.0	0.7	0.8	0.5	5.5	6.0	5.9	1.2	0.2	4.1
Planned Employment After Doctorate	%	65.8	29.3	41.1	50.3	62.8	81.2	47.5	67.8	15.1	26.3	24.5	74.3	60.8	39.4
Educ. Institution*		39.0	8.5	6.8	16.7	49.5	49.0	20.0	23.1	4.5	13.9	12.3	43.9	28.8	20.5
Industry/Business		13.5	13.8	31.1	18.2	7.4	25.3	20.9	34.6	8.5	5.5	6.0	11.1	13.7	8.3
Government		6.3	4.9	1.7	12.3	3.4	3.9	4.4	7.0	1.0	4.2	3.7	9.1	11.7	6.1
Nonprofit		4.2	0.5	0.4	1.1	0.7	1.1	0.6	1.2	0.4	1.2	1.1	7.9	3.3	2.6
Other & Unknown		2.8	1.5	1.1	2.0	1.9	1.8	1.5	1.9	0.6	1.6	1.4	2.3	3.4	1.9
Postdoc. Status Unknown	%	11.4	11.8	8.8	11.2	13.8	9.0	10.7	12.8	5.2	7.9	7.4	12.4	12.5	9.2
Definite Postdoc. Study	%	16.9	45.1	41.6	27.0	16.4	5.1	32.3	11.7	68.2	53.6	56.0	9.7	18.0	41.3
Seeking Postdoc. Study		5.8	13.8	8.5	11.5	7.0	4.7	9.5	7.7	11.5	12.2	12.1	3.6	8.7	10.1
Definite Employment		48.5	20.3	33.0	38.2	45.2	62.3	36.0	46.8	11.5	19.0	17.8	58.0	44.3	29.3
Seeking Employment		17.3	8.9	8.1	12.1	17.7	19.0	11.5	21.0	3.6	7.3	6.7	16.3	16.5	10.1
Employment Activity After Doctorate Primary Activity															
R & D	%	28.9	66.9	74.8	51.1	36.2	57.7	59.4	63.5	61.0	45.3	46.9	29.6	55.0	44.0
Teaching		36.9	18.8	13.1	22.3	53.0	32.3	26.8	20.0	20.8	27.7	26.9	40.5	18.4	28.5
Administration		12.6	0.8	1.4	5.0	2.1	2.1	2.1	1.7	1.3	4.7	4.4	10.5	3.8	6.1
Prof. Services		12.4	2.7	2.9	9.2	2.6	3.1	3.8	6.0	6.5	12.1	11.5	13.0	9.7	11.4
Other		3.1	3.5	2.2	7.1	0.8	0.5	2.4	2.4	6.5	4.3	4.5	1.8	5.6	4.0
Secondary Activity															
R & D	%	26.4	17.7	11.1	23.8	44.7	29.7	24.0	20.2	20.8	26.5	25.9	35.0	22.5	27.7
Teaching		14.6	6.2	2.9	10.6	26.7	28.6	14.2	13.1	6.5	14.1	13.3	15.4	20.0	15.9
Administration		8.4	9.6	16.3	11.7	2.6	5.2	9.9	8.7	20.8	10.1	11.2	11.4	11.0	11.2
Prof. Services		6.8	3.8	7.4	11.0	2.1	2.9	5.5	6.0	0.0	7.8	7.0	8.9	6.3	7.4
Other		2.3	1.9	1.2	0.7	0.8	0.8	1.1	1.3	0.0	1.8	1.6	1.2	1.6	1.5
No Secondary Activity		35.3	53.5	55.5	36.9	17.7	28.6	39.8	44.2	48.1	33.8	35.3	23.3	31.0	30.3
Activity(ies) Unknown	%	6.2	7.3	5.7	5.3	5.4	4.2	5.5	6.4	3.9	6.0	5.7	4.7	7.6	6.0
Region of Employment After Doctorate															
New England	%	6.1	6.5	5.8	6.7	7.5	6.6	6.5	4.8	10.4	5.5	6.0	4.2	3.1	4.6
Middle Atlantic		14.4	16.2	25.8	8.5	11.8	16.0	17.4	13.9	14.3	12.1	12.3	13.7	4.9	10.5
East No. Central		12.7	6.9	17.7	5.0	15.9	10.0	12.6	12.4	10.4	10.2	10.3	12.1	8.1	10.2
West No. Central		6.3	5.0	5.5	3.5	5.4	5.0	5.0	4.1	7.8	6.3	6.4	6.1	8.8	7.1
South Atlantic		15.1	13.5	14.1	13.1	14.9	12.9	13.8	11.5	18.2	16.2	16.4	16.6	13.3	15.6
East So. Central		4.6	3.5	4.3	3.2	4.1	3.9	3.9	3.2	0.0	4.6	4.1	6.5	4.0	4.8
West So. Central		7.8	4.6	6.1	16.7	8.7	8.9	8.5	8.0	5.2	5.8	5.7	11.0	5.9	7.4
Mountain		5.0	7.3	2.2	11.3	3.9	3.9	4.8	5.2	2.6	3.7	3.6	4.6	4.9	4.3
Pacific & Insular		10.6	21.9	9.4	16.3	8.5	18.1	13.6	13.4	13.0	12.2	12.3	10.3	8.8	10.7
Foreign		9.8	9.2	4.1	11.3	12.9	8.1	8.4	16.7	10.4	17.0	16.3	8.6	30.5	18.1
Region Unknown		7.6	5.4	4.9	4.3	6.4	6.6	5.5	6.8	7.8	6.4	6.6	6.3	7.7	6.8

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Physical Sciences includes Mathematics and Computer Sciences, as well as Physics/Astronomy, Chemistry, and Earth/Atmospheric/Marine Sciences. Refer also to the explanatory note about this table in front of Appendix A.
*Includes 2-year, 4-year, and foreign colleges and universities, medical schools, and elementary/secondary schools.

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Psychology	Economics	Anthropology and Sociology	Political Sci./ Internat'l Rel.	Other Social Sciences	SOCIAL SCI. INCL. PSYCH.	TOTAL SCIENCES	History	Eng. and Amer. Lang. and Lit	Foreign Lang. and Lit.	Other Humanities	HUMANITIES	EDUCATION	Business and Management	Other Professional Fields	Other Fields †	PROFESSIONAL/ OTHER FIELDS	TOTAL NONSCIENCES
3209	898	759	524	565	5955	22294	535	721	430	1872	3558	6265	1071	1076	55	2202	12025
43.9	80.7	51.3	73.9	62.5	54.8	70.8	66.2	41.7	38.6	59.8	54.5	42.5	73.9	56.4	60.0	65.0	50.2
56.1	19.3	48.7	26.1	37.5	45.2	29.2	33.8	58.3	61.4	40.2	45.5	57.5	26.1	43.6	40.0	35.0	49.8
81.0	47.2	70.0	58.0	59.5	70.4	61.8	80.9	83.9	65.1	74.9	76.4	82.9	61.5	73.3		67.3	78.1
1.6	6.1	5.1	8.2	5.8	3.7	5.0	3.9	3.9	16.3	4.8	5.9	2.6	6.3	5.2		5.7	4.1
3.2	36.7	16.2	22.3	24.4	13.6	24.3	9.7	5.4	10.9	10.9	9.6	7.1	24.5	11.5		18.0	9.8
14.1	9.9	8.7	11.5	10.3	12.2	9.0	5.4	6.8	7.7	9.4	8.1	7.4	7.7	9.9		9.0	7.9
47.3	54.1	55.2	54.6	58.1	51.0	54.0	55.7	50.5	53.0	54.6	53.8	63.9	64.7	59.3		61.8	60.5
37.6	34.6	34.4	32.4	31.2	35.7	35.8	37.4	41.1	37.4	34.8	36.8	27.4	26.1	29.1		27.7	30.2
15.2	11.2	10.4	13.0	10.8	13.4	10.2	6.9	8.5	9.5	10.5	9.4	8.7	9.2	11.6		10.5	9.2
33.7	32.0	36.3	33.8	35.3	33.9	31.8	36.0	35.8	35.6	35.7	35.7	41.1	35.1	38.5		36.6	38.7
57.3	60.1	46.5	50.0	21.4	52.3	60.9	59.6	65.6	53.3	51.0	55.5	38.5	34.2	23.5		28.3	41.7
73.2	70.0	88.4	82.8	86.2	76.7	69.0	89.9	87.9	87.0	87.4	87.8	93.7	85.2	92.5		88.6	91.0
10.1	8.9	12.3	10.5	11.6	10.3	8.7	12.3	12.3	12.2	12.6	12.5	17.3	11.7	14.7		13.2	15.1
7.3	6.5	9.0	8.0	7.4	7.4	6.5	8.8	8.3	8.6	8.3	8.4	8.2	7.0	8.1		7.5	8.1
17.9	7.3	13.7	8.0	8.8	14.1	32.6	8.2	2.4	6.3	6.5	5.9	4.1	2.7	3.7		3.2	4.4
11.5	3.2	7.5	5.2	3.9	8.4	16.2	5.8	1.5	3.5	3.6	3.5	1.6	0.7	1.5		1.1	2.1
2.8	1.3	3.8	1.9	3.4	2.7	13.2	0.9	0.4	1.2	1.3	1.1	1.3	1.1	1.3		1.3	1.2
2.4	1.1	0.8	0.2	0.7	1.6	1.3	0.2	0.3	0.2	0.2	0.2	0.3	0.6	0.6		0.5	0.3
1.2	1.7	1.6	0.8	0.9	1.3	1.8	1.3	0.1	1.4	1.3	1.1	0.9	0.3	0.4		0.3	0.8
66.3	79.4	73.1	77.3	77.0	71.1	55.6	82.4	87.2	82.1	81.1	82.7	85.8	86.9	83.8		85.2	84.8
24.3	50.7	51.4	58.0	45.3	36.7	25.2	64.5	77.5	72.8	63.4	67.6	63.3	75.7	52.7		63.9	64.6
15.3	7.1	4.3	3.8	10.4	11.2	17.5	3.9	2.8	3.5	5.2	4.3	6.0	7.9	8.9		8.4	6.0
9.0	13.3	6.5	10.5	9.4	9.5	6.8	4.9	1.2	1.4	1.8	2.1	8.2	1.6	5.3		3.7	5.6
13.1	2.4	5.9	2.5	6.0	9.0	3.5	4.5	1.8	1.6	6.9	4.9	5.0	0.6	14.0		7.3	5.4
4.7	5.9	5.0	2.5	5.8	4.8	2.6	4.7	3.9	2.8	3.8	3.8	3.3	1.1	2.9		2.0	3.2
15.8	13.3	13.2	14.7	14.2	14.8	11.8	9.3	10.4	11.6	12.4	11.4	10.2	10.4	12.5		11.5	10.8
13.5	5.1	7.0	3.6	5.0	9.7	24.7	5.4	1.1	3.5	3.7	3.4	2.2	1.8	2.3		2.0	2.5
4.4	2.2	6.7	4.4	3.9	4.3	7.9	2.8	1.2	2.8	2.7	2.4	1.8	0.9	1.4		1.2	1.9
48.7	64.7	45.6	52.7	54.0	51.6	40.4	56.3	60.3	55.8	55.9	56.9	65.5	72.7	64.5		68.5	63.5
17.6	14.7	27.5	24.6	23.0	19.6	15.2	26.2	26.9	26.3	25.2	25.8	20.2	14.2	19.3		16.7	21.2
15.7	45.6	29.8	16.7	29.5	24.4	45.3	8.0	4.6	7.9	7.5	7.0	5.8	34.1	11.0		23.3	9.6
15.0	38.4	49.4	62.3	37.7	29.8	26.6	69.4	79.1	76.7	69.4	72.4	36.3	54.0	50.6		52.2	49.0
5.6	3.8	7.5	10.9	7.9	6.2	4.2	5.6	4.4	3.3	4.5	4.5	36.7	3.0	12.2		7.5	22.4
57.0	2.9	4.3	2.2	11.8	31.4	15.3	5.6	3.4	2.9	6.0	5.0	11.1	1.9	15.6		8.3	8.9
2.0	2.2	2.9	2.2	5.2	2.5	2.8	5.0	2.5	1.7	7.2	5.2	2.8	1.8	4.3		2.9	3.4
22.1	32.0	36.1	44.9	28.2	28.2	25.3	42.2	46.2	52.1	31.9	38.9	17.5	46.1	34.4		40.0	27.6
15.5	25.1	15.9	10.9	15.7	17.0	15.2	9.3	6.4	8.3	9.7	8.8	12.8	31.2	14.8		23.5	13.8
9.3	5.3	7.2	4.3	9.2	7.8	9.2	5.0	4.6	4.6	8.1	6.5	8.5	2.6	10.4		6.2	7.5
7.0	4.0	4.3	2.2	4.9	5.5	6.0	1.7	2.3	1.3	5.2	3.6	10.9	1.4	8.5		5.0	7.8
3.7	1.4	1.2	0.4	0.3	2.3	1.7	3.0	3.0	1.7	6.7	4.7	2.5	0.6	3.0		1.8	3.0
37.8	25.1	29.2	31.5	33.8	33.5	36.7	32.6	31.5	24.6	33.0	31.6	40.4	13.0	22.5		17.8	33.6
4.6	7.1	6.1	5.8	7.9	5.7	5.9	6.3	6.0	7.5	5.3	5.9	7.4	5.1	6.3		5.8	6.7
7.1	6.7	8.7	9.4	4.3	7.1	5.9	7.0	6.7	11.7	7.0	7.5	6.2	6.5	3.5		5.0	6.3
17.1	12.7	14.2	12.0	11.8	14.9	14.3	14.6	17.7	14.6	11.7	13.8	15.1	13.0	13.7		13.6	14.5
12.8	10.7	13.9	10.5	14.4	12.5	12.0	13.0	15.2	14.6	14.0	14.2	12.7	16.7	13.5		15.0	13.6
7.9	4.6	5.2	6.2	5.6	6.6	5.8	3.0	4.8	6.3	6.3	5.5	7.9	6.3	7.1		6.8	7.0
15.1	23.4	12.4	18.5	18.7	17.0	14.7	18.6	17.0	12.5	13.9	15.1	16.0	15.4	14.8		14.9	15.5
3.2	2.6	3.2	2.9	3.9	3.1	3.7	6.3	5.7	4.2	4.7	5.1	5.4	7.7	5.9		6.9	5.6
7.9	4.8	4.3	6.9	5.2	6.6	7.5	5.6	5.1	5.8	8.0	6.8	8.3	9.4	10.8		9.9	8.2
6.0	3.3	2.9	2.5	3.9	4.6	4.7	6.3	4.4	5.0	4.1	4.6	5.7	4.5	5.0		4.6	5.2
12.0	5.3	11.8	9.8	8.5	10.2	11.8	9.3	11.0	12.1	10.6	10.7	8.7	9.1	7.3		8.3	9.2
1.7	20.3	13.3	13.8	16.1	9.0	12.6	10.3	3.7	4.6	9.6	7.9	5.1	8.3	9.7		9.0	6.6
9.1	5.5	10.1	7.6	7.5	8.3	7.0	6.0	8.7	8.8	9.9	8.9	8.9	3.1	8.6		5.9	8.3

†Statistics are not presented for this group because too few records contained the specific data.

APPENDIX TABLE A-3 (Continued)

Doctorates: Men

		1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos. and Marine Sci.	Mathematics	Computer Sciences	PHYSICAL SCIENCES	ENGINEERING	Biochemistry	Other Biosciences	Biosciences Subtotal	Health Sciences	Agricultural Sciences	LIFE SCIENCES
Total Male		21809	1160	1474	590	705	505	4434	4163	404	2168	2572	347	998	3917
Male as a Percent of Total Doctorates	%	63.5	90.8	74.8	79.9	81.9	82.5	81.2	91.8	60.3	63.1	62.6	35.2	79.7	61.8
U.S. Citizenship	%	60.9	53.0	64.6	70.0	42.6	52.5	57.4	38.6	71.3	75.3	74.7	59.1	50.9	67.2
Non-U.S., Permanent Visa		5.2	4.3	4.2	4.1	3.8	9.1	4.7	8.0	3.5	3.6	3.6	4.9	4.7	4.0
Non-U.S., Temporary Visa		24.8	33.4	24.1	18.3	42.0	31.9	29.5	44.1	19.3	14.6	15.4	25.1	35.0	21.2
Unknown		9.1	9.3	7.1	7.6	11.6	6.5	8.4	9.3	5.9	6.5	6.4	11.0	9.4	7.6
Married	%	59.2	47.2	53.4	57.8	45.8	57.6	51.6	58.7	53.5	57.6	56.9	62.5	66.5	59.9
Not Married		30.6	42.5	38.5	33.2	41.0	34.5	38.8	30.7	40.3	35.0	35.8	25.4	22.9	31.6
Unknown		10.2	10.3	8.1	9.0	13.2	7.9	9.6	10.7	6.2	7.4	7.2	12.1	10.5	8.5
Median Age at Doct.	Yrs	33.0	30.0	29.3	32.3	30.7	31.5	30.3	31.3	29.6	31.6	31.3	34.9	33.7	32.1
Percent with Bacc. in Same Field as Doctorate	%	56.7	72.9	80.5	53.4	68.4	22.0	66.3	77.1	25.7	55.9	51.1	32.3	63.4	52.6
Percent with Masters	%	75.0	60.6	34.3	75.6	72.3	82.6	58.2	84.9	29.0	49.4	46.2	74.4	89.5	59.7
Median Time Lapse From Bacc. to Doct.															
Total Time	Yrs	9.6	7.2	6.5	9.2	7.7	8.6	7.4	8.2	7.0	8.5	8.2	11.5	10.2	8.9
Registered Time		6.7	6.4	5.5	6.9	6.1	6.4	6.1	6.0	6.1	6.7	6.6	7.1	6.4	6.5
Postdoctoral Study Plans	%	24.9	58.1	51.2	38.1	25.0	10.5	42.4	19.6	76.5	65.9	67.6	20.5	24.8	52.5
Fellowship		11.6	20.7	23.5	17.3	11.3	3.8	17.8	5.8	47.0	38.3	39.7	11.0	8.0	29.1
Research Assoc.		10.7	35.3	26.7	20.3	10.1	5.5	23.0	11.8	20.5	18.5	18.8	6.3	15.1	16.7
Traineeship		1.0	1.2	0.3	0.5	2.4	0.4	0.9	1.5	1.7	1.6	1.6	0.9	1.4	1.5
Other		1.6	0.9	0.7	0.0	1.1	0.8	0.7	0.5	7.2	7.6	7.5	2.3	0.3	5.2
Planned Employment After Doctorate	%	63.2	29.8	39.7	51.0	60.3	81.0	46.6	67.2	16.6	25.8	24.3	66.9	61.7	37.6
Educ. Institution*		34.9	8.7	6.2	16.1	46.7	49.3	19.5	22.8	4.0	12.5	11.2	30.8	29.1	17.5
Industry/Business		15.8	14.0	30.9	19.7	7.4	25.0	20.5	34.6	9.9	6.3	6.8	16.7	13.9	9.5
Government		6.7	5.0	1.7	12.0	4.0	4.2	4.6	6.8	1.7	4.8	4.4	12.1	12.1	7.0
Nonprofit		3.7	0.6	0.3	1.4	0.6	1.4	0.7	1.3	0.5	1.1	1.0	5.2	3.3	2.0
Other & Unknown		2.1	1.6	0.6	1.9	1.7	1.2	1.3	1.8	0.5	1.1	1.0	2.0	3.3	1.7
Postdoc. Status Unknown	%	11.9	12.1	9.2	10.8	14.8	8.5	11.0	13.2	6.9	8.3	8.1	12.7	13.4	9.9
Definite Postdoc. Study	%	18.5	44.2	42.5	26.9	17.0	5.7	32.7	11.8	65.8	53.8	55.7	15.6	16.5	42.1
Seeking Postdoc. Study		6.4	13.9	8.6	11.2	7.9	4.8	9.8	7.7	10.6	12.1	11.9	4.9	8.3	10.4
Definite Employment		47.0	21.0	32.8	39.7	42.8	61.8	35.5	46.6	12.6	19.3	18.3	53.0	45.7	28.3
Seeking Employment		16.2	8.8	6.9	11.4	17.4	19.2	11.1	20.7	4.0	6.5	6.1	13.8	16.0	9.3
Employment Activity After Doctorate Primary Activity															
R & D	%	35.6	67.6	76.2	53.4	40.4	59.9	61.4	63.5	72.5	48.9	51.5	40.8	54.2	50.8
Teaching		33.2	19.3	12.2	19.7	48.7	30.4	25.0	19.7	13.7	22.4	21.5	25.0	18.0	20.6
Administration		10.8	0.8	1.4	5.1	2.3	1.9	2.2	1.7	0.0	4.8	4.3	10.3	3.9	5.1
Prof. Services		10.5	2.5	2.5	9.0	2.0	2.2	3.3	6.1	7.8	12.2	11.7	15.2	9.6	11.4
Other		3.1	3.3	1.7	7.3	1.0	0.6	2.4	2.4	3.9	4.5	4.5	1.6	5.9	4.6
Secondary Activity															
R & D	%	24.9	17.6	9.9	21.8	42.4	28.2	22.7	20.1	19.6	24.8	24.3	25.0	22.4	23.6
Teaching		15.3	6.1	3.7	11 1	29.8	29.2	15.2	13.2	9.8	13.4	13.0	15.8	20.2	16.4
Administration		9.0	9.8	17.8	11.5	2.6	5.4	10.3	8.8	25.5	9.5	11.3	16.3	11.2	12.1
Prof. Services		6.1	3.3	7.4	12.4	2.6	2.6	5.6	6.1	0.0	7.4	6.6	9.2	5.9	6.8
Other		1.9	2.0	1.4	0.4	1.0	0.3	1.1	1.4	0.0	2.4	2.1	1.6	1.3	1.7
No Secondary Activity		36.0	54.5	53.7	37.2	15.9	29.5	39.3	43.8	43.1	35.3	36.2	25.0	30.7	32.1
Activity Unknown	%	6.8	6.6	6.0	5.6	5.6	4.8	5.7	6.5	2.0	7.2	6.6	7.1	8.3	7.4
Region of Employment After Doctorate															
New England	%	5.6	6.6	5.6	6.4	6.3	6.4	6.2	4.8	11.8	4.5	5.3	3.8	3.1	4.1
Middle Atlantic		13.9	15.6	24.2	7.7	11.9	16.0	16.4	13.4	15.7	12.4	12.8	16.3	4.4	9.9
East No. Central		12.5	7.0	18.8	5.1	18.5	10.3	13.2	11.9	13.7	10.5	10.9	9.8	7.5	9.3
West No. Central		6.1	5.3	5.2	3.4	4.6	5.1	4.8	3.9	7.8	6.4	6.6	8.2	8.3	7.6
South Atlantic		14.2	12.7	12.2	12.8	13.2	11.9	12.5	11.3	17.6	15.5	15.7	14.7	13.2	14.5
East So. Central		4.4	3.7	4.8	3.0	3.3	4.2	3.9	3.1	0.0	4.1	3.6	5.4	3.5	3.9
West So. Central		7.8	4.1	7.4	17.1	8.3	7.4	8.5	8.1	5.9	5.0	5.1	8.7	6.4	6.2
Mountain		5.1	7.4	2.1	12.4	4.0	3.8	5.1	5.3	2.0	3.8	3.6	3.3	5.0	4.1
Pacific & Insular		10.5	22.5	9.5	15.0	8.3	18.9	14.0	13.5	11.8	12.2	12.1	9.2	8.1	10.0
Foreign		13.2	9.4	5.0	12.4	14.2	9.3	9.4	17.6	7.8	19.1	17.9	14.7	33.8	23.9
Region Unknown		6.7	5.7	5.4	4.7	7.3	6.7	6.0	7.1	5.9	6.4	6.4	6.0	6.8	6.5

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Physical Sciences includes Mathematics and Computer Sciences, as well as Physics/Astronomy, Chemistry, and Earth/Atmospheric/Marine Sciences. Refer also to the explanatory note about this table in front of Appendix A.
*Includes 2-year, 4-year, and foreign colleges and universities, medical schools, and elementary/secondary schools.

Psychology	Economics	Anthropology and Sociology	Political Sci./ Internat'l Rel.	Other Social Sciences	SOCIAL SCI. INCL. PSYCH.	TOTAL SCIENCES	History	Eng. and Amer. Lang. and Lit.	Foreign Lang. and Lit.	Other Humanities	HUMANITIES	EDUCATION	Business and Management	Other Professional Fields	Other Fields †	PROFESSIONAL/ OTHER FIELDS	TOTAL NONSCIENCES
1409	725	389	387	353	3263	15777	354	301	166	1119	1940	2660	792	607	33	1432	6032
43.9	80.7	51.3	73.9	62.5	54.8	70.8	66.2	41.7	38.6	59.8	54.5	42.5	73.9	56.4	60.0	65.0	50.2
79.3	42.9	63.8	51.9	52.4	63.2	56.1	81.4	82.1	60.8	73.7	75.3	79.2	54.9	69.0		60.8	73.6
2.0	6.8	3.9	8.3	6.2	4.5	5.4	3.4	4.0	13.3	4.1	4.7	3.3	7.7	6.3		7.0	4.6
4.1	40.1	21.3	27.4	30.0	19.7	29.3	9.6	5.0	14.5	11.5	10.4	9.7	29.4	13.3		22.5	13.0
14.5	10.2	11.1	12.4	11.3	12.6	9.3	5.6	9.0	11.4	10.6	9.5	7.7	8.0	11.4		9.7	8.8
50.6	55.6	60.9	58.1	62.3	55.1	56.3	59.3	52.5	47.6	58.0	56.5	74.3	67.2	67.5		67.2	66.9
34.2	33.1	26.7	28.2	25.8	31.4	33.4	33.6	36.9	39.8	30.7	32.9	17.3	23.0	19.6		21.4	23.3
15.2	11.3	12.3	13.7	11.9	13.5	10.4	7.1	10.6	12.7	11.3	10.6	8.4	9.8	12.9		11.4	9.8
33.5	32.0	35.6	34.0	34.8	33.5	31.6	35.7	35.1	35.0	35.4	35.4	40.2	35.1	37.3		36.0	37.6
61.6	60.0	45.2	49.6	24.4	53.8	63.2	63.3	62.1	47.6	53.4	56.0	33.8	34.5	23.7		29.3	39.9
72.5	69.7	86.9	81.9	85.3	76.1	69.3	89.3	87.4	81.9	86.3	86.6	93.6	85.0	92.3		87.9	90.0
10.1	8.8	12.0	10.3	11.0	10.1	8.4	12.2	11.8	11.1	12.4	12.1	16.7	11.8	13.8		12.6	14.2
7.5	6.4	8.8	7.7	7.3	7.4	6.4	8.6	8.0	7.8	8.1	8.2	8.0	6.9	8.3		7.4	7.9
17.1	7.6	13.6	9.6	9.6	12.9	32.8	7.6	3.3	4.8	5.9	5.7	4.2	2.9	2.8		2.8	4.4
11.4	3.3	6.2	5.9	3.7	7.5	15.3	5.4	1.7	4.2	3.3	3.5	1.6	0.4	0.7		0.5	1.9
2.8	1.2	4.9	2.6	3.7	2.8	14.3	0.6	0.7	0.0	0.9	0.7	1.3	1.5	1.2		1.3	1.1
2.0	1.2	1.0	0.3	1.1	1.4	1.3	0.0	0.7	0.6	0.2	0.3	0.3	0.6	0.5		0.6	0.3
0.9	1.8	1.5	0.8	1.1	1.2	1.9	1.7	0.3	0.0	1.5	1.2	1.1	0.4	0.5		0.4	1.0
67.1	78.8	71.7	74.9	74.2	72.0	55.1	84.5	85.7	80.1	80.9	82.2	86.0	86.1	83.0		84.6	84.4
24.0	49.4	52.2	54.0	43.9	38.7	23.8	65.3	77.1	72.3	61.7	65.6	63.3	74.1	48.6		62.7	63.9
15.9	7.9	3.9	4.1	8.8	10.5	19.4	4.5	3.3	1.8	5.4	4.6	6.2	8.5	8.6		8.5	6.3
11.1	12.8	6.2	12.4	10.8	11.0	7.1	5.6	1.0	1.2	2.4	2.7	9.1	1.8	5.8		3.7	5.7
12.9	2.6	5.4	2.3	5.9	7.7	2.6	5.6	2.0	1.8	8.8	6.6	5.3	0.5	18.9		8.5	6.5
3.2	6.1	4.1	2.1	4.8	4.0	2.1	3.4	2.3	3.0	2.6	2.7	2.1	1.3	1.2		1.2	2.1
15.8	13.7	14.7	15.5	16.1	15.2	12.2	7.9	11.0	15.1	13.2	12.1	9.8	11.0	14.2		12.6	11.2
13.3	5.2	7.2	4.1	5.1	8.8	24.6	4.8	1.7	3.6	3.5	3.5	2.3	2.0	1.8		1.9	2.6
3.8	2.3	6.4	5.4	4.5	4.0	8.2	2.8	1.7	1.2	2.4	2.3	1.9	0.9	1.0		0.9	1.8
52.0	64.4	46.3	50.6	53.8	54.1	40.5	57.6	60.5	54.8	57.5	57.7	66.3	70.7	65.2		68.2	64.0
15.1	14.3	25.4	24.3	20.4	17.8	14.6	26.8	25.2	25.3	23.4	24.5	19.7	15.4	17.8		16.5	20.5
16.0	46.9	29.4	15.8	31.6	27.2	50.8	9.8	3.8	4.4	6.7	6.6	5.3	34.5	10.1		24.3	10.5
13.5	36.6	47.8	61.2	40.0	31.3	24.4	66.7	83.0	83.5	67.5	71.2	31.0	53.0	49.5		51.4	47.8
6.8	4.1	7.8	11.7	7.9	6.9	3.8	7.8	2.2	1.1	4.7	4.6	42.4	3.2	10.4		6.4	22.3
56.1	3.2	4.4	3.1	7.9	25.8	11.8	5.4	3.3	3.3	7.8	6.3	9.7	2.0	17.9		8.6	8.4
1.6	2.1	2.8	2.6	5.3	2.4	2.8	3.4	2.7	1.1	7.8	5.6	2.5	2.1	6.1		3.7	3.7
22.2	29.8	33.3	43.9	28.9	28.5	23.7	36.8	46.2	58.2	28.9	35.5	15.1	44.5	31.6		38.5	27.0
15.8	27.0	17.2	8.7	15.8	18.1	15.6	11.3	6.0	4.4	9.3	8.8	12.8	31.8	14.9		24.8	14.7
10.9	5.4	5.6	5.1	10.5	8.2	9.6	6.9	6.6	5.5	10.1	8.6	8.0	3.0	14.1		7.6	8.1
6.8	3.0	5.0	2.6	3.2	4.8	5.7	2.0	1.6	1.1	5.0	3.6	10.2	1.3	7.1		3.9	6.7
3.5	1.3	1.7	0.5	0.5	2.1	1.6	2.5	1.6	1.1	6.5	4.6	1.6	0.5	3.5		1.8	2.5
34.7	26.6	29.4	33.7	33.7	31.8	37.3	33.8	33.0	23.1	34.5	33.2	43.2	13.8	22.7		17.7	33.8
6.0	7.1	7.8	5.6	7.4	6.6	6.5	6.9	4.9	6.6	5.6	5.8	9.1	5.2	6.1		5.6	7.3
6.1	5.1	5.6	7.7	4.7	5.8	5.3	6.4	5.5	13.2	6.8	7.1	6.0	6.1	3.3		4.8	6.0
19.0	13.3	15.6	11.7	10.5	15.4	14.1	14.7	17.0	11.0	11.7	13.0	14.4	13.0	10.6		12.3	13.5
14.5	11.6	11.1	9.2	12.6	12.6	11.9	10.8	13.7	12.1	12.6	12.4	13.6	16.3	11.6		14.2	13.4
7.1	4.7	6.7	5.1	4.7	5.9	5.3	2.9	4.4	6.6	5.6	5.0	8.7	6.3	8.3		7.4	7.3
14.7	22.1	8.3	16.3	15.3	16.3	13.5	19.6	17.0	14.3	14.9	16.1	15.4	14.6	14.6		14.4	15.3
3.4	2.1	2.8	3.6	4.2	3.1	3.4	7.4	6.0	4.4	5.3	5.7	5.2	7.7	7.3		7.5	5.9
8.9	4.7	5.0	7.7	4.7	6.8	7.5	6.9	6.0	7.7	8.4	7.7	7.7	8.9	12.9		10.3	8.3
6.1	3.6	3.3	2.6	4.2	4.6	4.9	5.4	4.4	4.4	3.9	4.3	6.7	4.6	5.1		4.7	5.5
10.6	4.5	12.2	8.7	8.9	8.8	11.7	8.3	13.2	12.1	9.8	10.3	7.2	0.4	7.6		9.3	8.6
2.5	22.5	20.0	18.4	21.6	13.4	15.5	11.8	4.9	6.6	12.4	10.6	7.7	9.3	13.4		11.1	9.4
7.1	5.8	9.4	9.2	8.4	7.4	6.8	5.9	7.7	7.7	8.6	7.9	7.4	2.9	5.3		3.9	6.7

†Statistics are not presented for this group because too few records contained the specific data.

APPENDIX TABLE A-3 (Continued)

Doctorates: Women

		1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos., and Marine Sci.	Mathematics	Computer Sciences	PHYSICAL SCIENCES	ENGINEERING	Biochemistry	Other Biosciences	Biosciences Subtotal	Health Sciences	Agricultural Sciences	LIFE SCIENCES
Total Female		12510	118	497	148	156	107	1026	373	266	1268	1534	638	254	2426
Female as a Percent of Total Doctorates	%	36.5	9.2	25.2	20.1	18.1	17.5	18.8	8.2	39.7	36.9	37.4	64.8	20.3	38.2
U.S. Citizenship	%	79.0	49.2	68.4	77.0	59.6	67.3	66.0	66.0	73.7	77.5	76.9	81.0	69.7	77.2
Non-U.S., Permanent Visa		3.8	10.2	4.4	4.1	5.1	10.3	5.8	7.0	7.5	5.1	5.5	1.3	3.1	4.2
Non-U.S., Temporary Visa		9.5	33.9	21.3	8.8	30.1	16.8	21.8	23.9	18.0	12.3	13.3	7.4	23.6	12.8
Unknown		7.6	6.8	5.8	10.1	5.1	5.6	6.4	3.2	0.8	5.0	4.3	10.3	3.5	5.8
Married	%	51.3	52.5	49.7	45.9	55.8	53.3	50.8	55.0	53.8	47.2	48.3	54.1	48.0	49.8
Not Married		39.5	40.7	43.1	43.2	37.2	36.4	41.2	41.3	44.7	45.7	45.5	34.6	45.7	42.7
Unknown		9.2	6.8	7.2	10.8	7.1	10.3	8.0	3.8	1.5	7.2	6.2	11.3	6.3	7.5
Median Age at Doct.	Yrs	36.0	29.8	28.7	31.8	30.7	34.9	29.9	29.9	29.9	31.4	31.1	38.2	32.3	32.5
Percent with Bacc. in Same Field as Doctorate	%	49.7	76.3	79.3	43.9	69.2	15.0	65.6	65.7	23.3	61.0	54.4	57.1	51.2	54.8
Percent with Masters	%	79.7	73.7	36.2	69.6	76.3	83.2	56.3	83.9	27.4	49.2	45.4	85.9	92.1	61.0
Median Time Lapse From Bacc. to Doct.															
Total Time	Yrs	12.5	7.3	6.4	9.2	8.0	12.4	7.3	7.2	7.4	8.7	8.3	14.6	9.5	9.6
Registered Time		7.4	6.5	5.5	7.0	6.4	7.1	6.1	5.8	6.0	6.5	6.4	7.3	6.6	6.6
Postdoctoral Study Plans	%	18.9	66.9	46.9	39.9	16.0	6.5	39.3	18.2	84.6	65.6	68.9	9.4	33.9	49.6
Fellowship		10.7	20.3	24.1	16.9	7.7	2.8	17.9	5.9	55.6	42.3	44.6	5.2	10.6	30.7
Research Assoc.		6.1	43.2	21.3	21.6	6.4	2.8	19.7	11.0	24.4	18.4	19.4	3.1	22.8	15.5
Traineeship		0.9	1.7	0.6	0.0	1.3	0.9	0.8	0.8	1.5	1.7	1.6	0.5	0.4	1.2
Other		1.2	1.7	0.8	1.4	0.6	0.0	0.9	0.5	3.0	3.3	3.3	0.6	0.0	2.2
Planned Employment After Doctorate	%	70.5	23.7	45.3	47.3	74.4	82.2	51.4	74.0	12.8	27.3	24.8	78.4	57.1	42.3
Educ. Institution*		46.2	6.8	8.7	18.9	62.2	47.7	22.1	26.5	5.3	16.2	14.3	50.9	28.0	25.4
Industry/Business		9.4	12.7	31.8	12.2	7.7	27.1	22.6	34.6	6.4	4.3	4.6	8.0	12.6	6.3
Government		5.7	3.4	1.8	13.5	0.6	2.8	3.6	9.1	0.0	3.0	2.5	7.5	9.8	4.6
Nonprofit		5.1	0.0	0.6	0.0	1.3	0.0	0.5	0.8	0.4	1.4	1.2	9.4	3.1	3.6
Other & Unknown		4.1	0.8	2.4	2.7	2.6	4.7	2.5	2.9	0.8	2.4	2.2	2.5	3.5	2.4
Postdoc. Status Unknown	%	10.7	9.3	7.8	12.8	9.6	11.2	9.4	7.8	2.6	7.1	6.3	12.2	9.1	8.2
Definite Postdoc. Study	%	14.1	53.4	38.6	27.0	13.5	1.9	31.0	10.5	71.8	53.3	56.5	6.6	23.6	39.9
Seeking Postdoc. Study		4.8	13.6	8.2	12.8	2.6	4.7	8.3	7.8	12.8	12.3	12.4	2.8	10.2	9.6
Definite Employment		51.2	13.6	33.6	32.4	55.8	64.5	37.7	48.8	9.8	18.5	17.0	60.7	39.0	30.8
Seeking Employment		19.3	10.2	11.7	14.9	18.6	17.8	13.6	25.2	3.0	8.8	7.8	17.7	18.1	11.5
Employment Activity After Doctorate															
Primary Activity															
R & D	%	18.2	56.3	70.7	39.6	21.8	47.8	51.2	62.6	38.5	38.7	38.7	24.3	58.6	33.9
Teaching		42.7	12.5	15.6	35.4	67.8	40.6	34.1	23.6	34.6	37.0	36.8	47.8	20.2	40.3
Administration		15.4	0.0	1.2	4.2	1.1	2.9	1.8	1.6	3.8	4.7	4.6	10.6	3.0	7.5
Prof. Services		15.4	6.3	4.2	10.4	4.6	7.2	5.7	4.4	3.8	11.9	11.1	11.9	10.1	11.4
Other		3.0	6.3	3.6	6.3	0.0	0.0	2.6	2.7	11.5	3.8	4.6	1.8	4.0	3.1
Secondary Activity															
R & D	%	28.7	18.8	14.4	33.3	52.9	36.2	29.5	21.4	23.1	29.4	28.7	39.8	23.2	33.7
Teaching		13.5	6.3	0.6	8.3	16.1	26.1	9.8	12.1	0.0	15.3	13.8	15.2	19.2	15.3
Administration		7.5	6.3	12.0	12.5	2.3	4.3	8.3	7.7	11.5	11.1	11.1	9.0	10.1	9.9
Prof. Services		8.0	12.5	7.2	4.2	0.0	4.3	4.9	5.5	0.0	8.5	7.7	8.8	8.1	8.3
Other		2.8	0.0	0.6	2.1	0.0	2.9	1.0	0.0	0.0	0.9	0.8	1.0	3.0	1.2
No Secondary Activity		34.2	37.5	60.5	35.4	24.1	24.6	41.9	48.4	57.7	31.1	33.7	22.5	32.3	27.7
Activity Unknown	%	5.3	18.8	4.8	4.2	4.6	1.4	4.7	4.9	7.7	3.8	4.2	3.6	4.0	3.9
Region of Employment After Doctorate															
New England	%	6.9	6.3	6.6	8.3	11.5	7.2	8.0	4.4	7.7	7.2	7.3	4.4	3.0	5.2
Middle Atlantic		15.2	25.0	30.5	12.5	11.5	15.9	21.2	19.2	11.5	11.5	11.5	12.4	7.1	11.4
East No. Central		13.1	6.3	14.4	4.2	6.9	8.7	10.1	18.1	3.8	9.8	9.2	13.2	11.1	11.5
West No. Central		6.8	0.0	6.6	4.2	8.0	4.3	5.9	6.6	7.7	6.0	6.1	5.2	11.1	6.3
South Atlantic		16.5	25.0	19.8	14.6	20.7	17.4	19.1	13.2	19.2	17.4	17.6	17.6	14.1	17.1
East So. Central		4.8	0.0	3.0	4.2	6.9	2.9	3.9	4.4	0.0	5.5	5.0	7.0	6.1	6.2
West So. Central		7.8	12.5	2.4	14.6	10.3	15.9	8.5	6.0	3.8	7.2	6.9	12.1	4.0	9.2
Mountain		4.7	6.3	2.4	6.3	3.4	4.3	3.6	4.4	3.8	3.4	3.4	5.2	4.0	4.4
Pacific & Insular		10.6	12.5	9.0	22.9	9.2	14.5	11.9	12.1	15.4	12.3	12.6	10.9	12.1	11.6
Foreign		4.4	6.3	1.8	6.3	8.0	2.9	4.1	7.1	15.4	13.2	13.4	5.7	15.2	9.6
Region Unknown		9.1	0.0	3.6	2.1	3.4	5.8	3.6	4.4	11.5	6.4	6.9	6.5	12.1	7.4

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Physical Sciences includes Mathematics and Computer Sciences, as well as Physics/Astronomy, Chemistry, and Earth/Atmospheric/Marine Sciences. Refer also to the explanatory note about this table in front of Appendix A.
*Includes 2-year, 4-year, and foreign colleges and universities, medical schools, and elementary/secondary schools.

Psychology	Economics	Anthropology and Sociology	Political Sci./ Internat'l Rel.	Other Social Sciences	SOCIAL SCI. INCL. PSYCH.	TOTAL SCIENCES	History	Eng. and Amer. Lang. and Lit.	Foreign Lang. and Lit.	Other Humanities	HUMANITIES	EDUCATION	Business and Management	Other Professional Fields	Other Fields †	PROFESSIONAL/ OTHER FIELDS	TOTAL NONSCIENCES
1800	173	370	137	212	2692	6517	181	420	264	753	1618	3605	279	469	22	770	5993
56.1	19.3	48.7	26.1	37.5	45.2	29.2	33.8	58.3	61.4	40.2	45.5	57.5	26.1	43.6	40.0	35.0	49.8
82.3	65.3	76.5	75.2	71.2	79.2	75.6	80.1	85.2	67.8	76.6	77.8	85.6	80.3	78.9		79.2	82.7
1.3	3.5	6.5	8.0	5.2	2.8	4.0	5.0	3.8	18.2	5.8	7.2	2.1	2.5	3.8		3.4	3.6
2.5	22.5	10.8	8.0	15.1	6.2	12.1	9.9	5.7	8.7	10.0	8.7	5.1	10.4	9.2		9.7	6.7
13.8	8.7	6.2	8.8	8.5	11.8	8.2	5.0	5.2	5.3	7.6	6.3	7.2	6.8	8.1		7.7	7.0
44.7	48.0	49.2	44.5	50.9	46.0	48.7	48.6	49.0	56.4	49.7	50.5	56.3	57.7	48.6		51.7	54.1
40.2	41.0	42.4	44.5	40.1	40.8	41.6	44.8	44.0	36.0	41.0	41.4	34.8	35.1	41.4		39.4	37.2
15.2	11.0	8.4	10.9	9.0	13.3	9.8	6.6	6.9	7.6	9.3	8.1	8.9	7.2	10.0		9.0	8.7
33.9	31.5	37.1	33.4	37.1	34.4	32.4	36.6	36.6	35.9	36.2	36.3	41.7	35.0	39.9		37.9	40.0
54.0	60.7	47.8	51.1	16.5	50.5	55.3	52.5	68.1	56.8	47.5	54.9	42.0	33.3	23.2		26.5	43.5
73.7	71.7	90.0	85.4	87.7	77.5	68.4	91.2	88.3	90.2	89.0	89.2	93.8	85.7	92.8		90.0	92.1
10.1	9.1	12.7	11.0	12.7	10.7	9.4	12.5	13.0	12.9	13.1	13.0	17.8	11.4	16.2		14.3	16.2
7.2	6.8	9.2	8.5	7.5	7.4	6.7	9.0	8.6	9.0	8.5	8.6	8.2	7.1	8.0		7.6	8.3
18.6	6.4	13.8	3.6	7.5	15.5	32.1	9.4	1.7	7.2	7.3	6.1	3.9	2.2	4.9		4.0	4.5
11.5	2.9	8.9	2.9	4.2	9.6	18.5	6.6	1.4	3.0	4.0	3.5	1.6	1.8	2.5		2.2	2.2
2.8	1.7	2.7	0.0	2.8	2.6	10.6	1.7	0.2	1.9	2.0	1.5	1.3	0.0	1.5		1.2	1.4
2.7	0.6	0.5	0.0	0.0	1.9	1.4	0.6	0.0	0.0	0.3	0.2	0.3	0.4	0.6		0.5	0.3
1.6	1.2	1.6	0.7	0.5	1.4	1.6	0.6	0.0	2.3	1.1	0.9	0.7	0.0	0.2		0.1	0.7
65.7	82.1	74.6	83.9	81.6	70.1	57.0	78.5	88.3	83.3	81.5	83.3	85.6	89.2	84.9		86.4	85.1
24.6	56.1	50.5	69.3	47.6	34.2	28.6	63.0	77.9	73.1	66.0	69.9	63.2	80.3	58.0		66.0	65.4
14.8	4.0	4.9	2.9	13.2	12.0	12.9	2.8	2.4	4.5	4.9	4.0	5.9	6.5	9.4		8.3	5.7
7.3	15.0	6.8	5.1	7.1	7.6	5.9	3.3	1.4	1.5	0.9	1.4	7.5	1.1	4.7		3.6	5.4
13.2	1.7	6.5	2.9	6.1	10.4	5.8	2.2	1.7	1.5	4.1	2.8	4.8	0.7	7.7		4.9	4.3
5.9	5.2	5.9	3.6	7.5	5.9	3.9	7.2	5.0	2.7	5.6	5.1	4.2	0.7	5.1		3.5	4.4
15.8	11.6	11.6	12.4	10.8	14.4	10.9	12.2	10.0	9.5	11.2	10.7	10.4	8.6	10.2		9.6	10.4
13.6	4.6	6.8	2.2	4.7	10.8	24.8	6.6	0.7	3.4	4.1	3.4	2.2	1.1	3.0		2.2	2.5
4.9	1.7	7.0	1.5	2.8	4.7	7.3	2.8	1.0	3.8	3.2	2.7	1.8	1.1	1.9		1.8	2.0
46.1	65.9	44.9	58.4	54.2	48.5	40.2	53.6	60.2	56.4	53.7	55.8	65.0	78.5	63.5		69.2	63.1
19.6	16.2	29.7	25.5	27.4	21.7	16.8	24.9	28.1	26.9	27.9	27.4	20.6	10.8	21.3		17.1	22.0
15.4	40.4	30.1	18.8	26.1	20.6	31.8	4.1	5.1	10.1	8.9	7.5	6.3	33.3	12.1		21.6	8.7
16.4	45.6	51.2	65.0	33.9	27.9	32.0	75.3	76.3	72.5	72.5	73.9	40.2	56.6	52.0		53.5	50.1
4.6	2.6	7.2	8.8	7.8	5.3	5.2	1.0	5.9	4.7	4.2	4.4	32.4	2.3	14.8		9.6	22.5
57.8	1.8	4.2	0.0	18.3	39.1	23.8	6.2	3.6	2.7	3.2	3.5	12.1	1.8	12.4		7.9	9.5
2.4	2.6	3.0	1.3	5.2	2.7	2.8	8.2	2.4	2.0	6.2	4.7	2.9	0.9	2.0		1.5	3.1
22.0	41.2	39.2	47.5	27.0	27.9	29.3	53.6	46.2	48.3	36.6	43.1	19.3	50.2	38.3		42.6	28.3
15.2	17.5	14.5	16.3	15.7	15.4	14.3	5.2	6.7	10.7	10.4	8.9	12.7	29.7	14.8		21.0	13.0
7.8	5.3	9.0	2.5	7.0	7.4	8.2	1.0	3.2	4.0	5.0	3.9	9.0	1.4	5.4		3.8	7.0
7.1	7.9	3.6	1.3	7.8	6.4	6.7	1.0	2.8	1.3	5.4	3.5	11.4	1.8	10.4		6.9	8.9
3.9	1.8	0.6	0.0	0.0	2.7	1.8	4.1	4.0	2.0	6.9	5.0	3.2	0.9	2.3		1.7	3.4
40.6	19.3	28.9	26.3	33.9	35.8	35.3	29.9	30.4	25.5	30.7	29.7	38.3	11.0	22.1		18.0	33.4
3.4	7.0	4.2	6.3	8.7	4.4	4.3	5.2	6.7	8.1	5.0	6.0	6.1	5.0	6.7		6.0	6.0
8.0	13.2	12.0	13.8	3.5	8.9	7.4	8.2	7.5	10.7	7.2	8.0	6.3	7.8	3.7		5.4	6.6
15.4	10.5	12.7	12.5	13.9	14.3	14.8	14.4	18.2	16.8	11.9	14.7	15.6	12.8	17.8		15.9	15.5
11.3	7.0	16.9	13.8	17.4	12.3	12.2	17.5	16.2	16.1	16.3	16.4	12.0	17.8	16.1		16.5	13.7
8.7	4.4	3.6	8.8	7.0	7.5	6.9	3.1	5.1	6.0	7.4	6.1	7.3	6.4	5.4		5.6	6.7
15.4	28.9	16.9	23.8	24.3	18.1	17.6	16.5	17.0	11.4	12.4	14.0	16.4	17.4	15.1		15.8	15.7
3.0	4.4	3.6	1.3	3.5	3.1	4.2	4.1	5.5	4.0	3.7	4.3	5.5	7.8	4.0		5.8	5.3
7.1	5.3	3.6	5.0	6.1	6.3	7.4	3.1	4.3	4.7	7.4	5.6	8.8	0.5	8.1		9.0	8.1
5.9	1.8	2.4	2.5	3.5	4.7	4.4	8.2	4.3	5.4	4.5	5.0	5.0	4.1	5.0		4.5	4.9
13.3	8.8	11.4	12.5	7.8	12.1	11.9	11.3	9.5	12.1	11.9	11.2	9.9	5.9	7.0		6.6	9.7
1.0	11.4	6.0	2.5	7.0	3.1	5.4	7.2	2.8	3.4	5.2	4.4	3.1	5.9	4.7		5.3	3.7
11.0	4.4	10.8	3.8	6.1	9.5	7.7	6.2	9.5	9.4	12.1	10.3	10.1	3.7	13.1		9.6	10.1

†Statistics are not presented for this group because too few records contained the specific data.

SOURCE: National Research Council, Survey of Earned Doctorates.

APPENDIX TABLE A-4 Statistical Profile of Doctorate Recipients, by Race/Ethnicity and Citizenship, 1989

		Total				American Indian	Asian				Black			
		Total	U.S.	Non-U.S. Perm.	Non-U.S. Temp.	Total	Total	U.S.	Non-U.S. Perm.	Non-U.S. Temp.	Total	U.S.	Non-U.S. Perm.	Non-U.S. Temp.
Total Number		34319*	23172	1605	6590	93	5150*	624	631	3877	1229*	811	135	272
Male	%	63.5	57.3	70.2	81.9	51.6	80.2	70.5	72.4	83.0	54.8	39.8	88.1	81.3
Female		36.5	42.7	29.8	18.1	48.4	19.8	29.5	27.6	17.0	45.2	60.2	11.9	18.8
Doctoral Field														
Physical Sciences	%	15.9	13.9	16.7	23.2	19.4	24.5	18.8	21.6	25.8	5.5	4.3	6.7	8.8
Engineering		13.2	8.0	22.5	29.2	7.5	31.3	27.6	29.5	32.3	4.6	2.8	6.7	8.5
Life Sciences		18.5	19.5	16.0	17.3	12.9	16.3	22.1	17.1	15.2	14.4	9.2	17.8	27.6
Social Sciences		17.4	18.1	13.8	12.3	19.4	10.8	11.4	10.1	10.9	20.1	20.1	18.5	20.2
Humanities		10.4	11.7	13.0	5.2	7.5	4.0	6.4	7.0	3.1	7.7	8.9	6.7	4.8
Education		18.3	22.4	10.1	6.7	25.8	6.4	8.8	7.1	5.8	39.6	48.0	30.4	20.6
Professional/Other		6.4	6.4	7.9	6.0	7.5	6.6	5.0	7.6	6.7	8.0	6.7	13.3	9.6
Median Age at Doct.	Yrs	33.8	34.5	33.7	32.6	36.8	32.5	32.2	32.7	32.6	38.1	39.0	38.3	35.9
Median Time Lapse From Bacc. to Doct.														
Total Time	Yrs	10.5	11.1	10.0	9.2	13.1	9.2	9.2	9.9	9.2	13.1	15.5	10.1	10.2
Registered Time		6.9	7.2	7.1	6.2	7.5	6.4	6.8	7.1	6.2	7.6	8.3	6.6	6.4
Graduate School Support														
Federal Fellow/Trainee	%	9.4	12.5	4.9	3.7	11.8	4.5	16.0	4.6	2.6	12.4	14.7	3.7	10.3
Federal Research Asst.		11.5	11.8	13.6	15.4	11.8	18.2	19.6	18.7	18.0	4.4	4.6	4.4	4.0
GI Bill		1.5	2.3	0.1	0.0	4.3	0.1	1.0	0.0	0.0	1.4	2.1	0.0	0.0
Foreign Government		4.4	0.5	7.7	19.3	0.0	10.2	1.1	3.3	12.8	7.6	0.4	17.8	23.5
National Fellowship		4.2	4.8	3.6	4.1	1.1	3.4	6.1	2.4	3.1	7.8	8.1	5.9	7.7
Univ. Teaching Asst.	%	44.8	47.9	53.5	51.7	33.3	52.3	44.1	54.0	53.5	34.1	30.7	36.3	43.0
Univ. Research Asst.		35.0	34.2	45.7	50.4	25.8	53.0	43.1	52.1	54.9	22.5	18.6	31.9	29.0
Other University		24.1	27.7	24.5	22.0	14.0	20.4	26.6	20.8	19.4	34.6	38.7	28.9	26.5
Business/Employer		4.6	6.1	2.2	1.8	4.3	2.4	7.9	2.2	1.6	4.6	6.4	0.0	1.5
Self/Family Sources		65.4	77.4	70.2	50.9	77.4	53.3	63.5	64.7	49.9	76.2	82.1	77.0	59.6
Guaranteed Student Loan	%	21.0	30.0	14.0	0.4	28.0	3.6	20.2	8.2	0.1	28.3	37.9	30.4	0.0
Other Loans		6.5	8.8	5.1	1.5	9.7	1.5	5.8	2.2	0.7	12.0	15.0	14.1	2.6
Other		3.0	3.2	2.5	4.1	5.4	2.4	2.4	1.1	2.7	5.0	3.8	3.7	9.2
Unknown		10.6	2.2	2.9	2.8	4.3	2.3	1.6	3.0	2.0	4.1	3.3	5.2	4.8
Postdoctoral Plans														
Postdoctoral Study	%	22.7	22.1	25.9	34.2	14.0	35.5	30.6	30.1	37.3	14.6	10.5	15.6	25.7
Planned Employment	%	65.8	75.5	68.8	60.2	77.4	58.5	64.1	64.8	56.8	80.7	85.7	78.5	69.1
Educ. Institution		39.0	44.9	38.0	35.9	39.8	31.9	26.8	27.1	33.6	54.5	58.9	53.3	43.4
Industry/Business		13.5	14.8	21.2	12.9	18.3	17.2	26.1	28.7	13.9	7.2	7.2	8.1	7.0
Government		6.3	7.4	2.9	6.3	8.6	4.7	5.9	2.4	4.8	10.6	11.5	7.4	9.9
Nonprofit		4.2	5.4	2.9	2.0	6.5	2.2	3.2	2.4	2.0	4.2	4.2	5.2	3.7
Other & Unknown		2.8	3.0	3.9	3.1	4.3	2.6	2.1	4.3	2.4	4.2	3.9	4.4	5.1
Postdoc. Status Unknown	%	11.4	2.5	5.3	5.6	8.6	5.9	5.3	5.1	5.9	4.6	3.8	5.9	5.1
Definite Postdoc. Study	%	16.9	17.5	15.8	22.5	12.9	24.3	23.6	19.0	25.3	8.5	7.6	5.2	12.5
Seeking Postdoc. Study		5.8	4.6	10.1	11.7	1.1	11.3	7.1	11.1	12.0	6.1	2.8	10.4	13.2
Definite Employment		48.5	57.3	42.1	40.5	57.0	38.0	45.7	39.1	36.7	55.2	61.7	43.7	44.1
Seeking Employment		17.3	18.2	26.7	19.7	20.4	20.5	18.4	25.7	20.0	25.5	24.0	34.8	25.0
Employment Location after Doctorate														
U.S.	%†	82.5	91.9	75.1	38.5	94.3	55.5	91.9	77.3	44.5	74.1	87.4	57.6	26.7
Foreign		9.8	1.2	14.6	51.3	0.0	33.8	1.1	11.3	44.3	13.0	0.4	27.1	58.3
Unknown		7.6	6.9	10.2	10.1	5.7	10.6	7.0	11.3	11.2	13.0	12.2	15.3	15.0

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix A for a discussion of past changes in the survey question on race/ethnicity.

*Includes individuals who did not report their citizenship at time of doctorate.
†The base for this percentage is the number of doctorates in the column caption group who have found definite employment.

White				Puerto Rican	Mexican-American				Other Hispanic				Other & Unknown		
Total	U.S.	Non-U.S. Perm.	Non-U.S. Temp.	Total	Total	U.S.	Non-U.S. Perm.	Non-U.S. Temp.	Total	U.S.	Non-U.S. Perm.	Non-U.S. Temp.	Total	U.S.	Non-U.S.
23112*	20688	666	1725	175	210*	155	18	37	656*	240	93	318	3694*	387	422
59.4	57.5	65.5	79.5	49.7	63.8	58.1	66.7	86.5	66.3	54.2	60.2	77.4	69.9	72.9	83.9
40.6	42.5	34.5	20.5	50.3	36.2	41.9	33.3	13.5	33.7	45.8	29.8	22.6	30.1	27.1	16.1
14.6	14.0	15.9	21.8	13.7	10.5	8.4	11.1	18.9	15.9	13.8	11.8	18.6	15.8	22.2	15.9
9.5	7.6	21.0	28.1	4.0	11.0	6.5	22.2	24.3	13.1	6.7	10.8	18.9	14.6	11.4	25.1
19.4	19.9	13.5	16.4	17.7	16.7	12.9	27.8	27.0	23.8	13.8	17.2	33.3	16.2	21.4	21.3
17.7	18.2	15.3	13.4	19.4	23.3	25.2	16.7	18.9	17.2	21.3	18.3	13.8	22.6	15.0	24.9
11.9	11.9	18.5	9.8	13.1	11.9	14.2	5.6	5.4	12.7	15.8	25.8	6.6	9.7	15.0	5.5
20.3	21.9	8.7	5.9	29.1	23.3	29.0	11.1	5.4	13.4	22.9	11.8	6.3	14.5	11.1	10.0
6.4	6.5	7.1	4.6	2.9	3.3	3.9	5.6	0.0	4.0	5.8	4.3	2.5	6.6	3.9	7.3
34.1	34.4	33.6	31.6	34.8	34.5	34.8	33.5	32.9	34.6	35.4	34.3	33.9	34.0	32.9	34.1
10.8	11.1	9.8	8.5	12.1	10.8	11.1	11.7	9.6	10.7	11.9	10.6	10.3	10.4	9.6	10.4
7.1	7.1	7.2	6.1	7.6	6.9	7.4	5.7	5.7	6.6	7.3	7.1	5.9	6.7	6.8	6.6
11.4	12.1	5.1	4.5	19.4	21.0	25.2	11.1	8.1	9.6	17.1	4.3	5.7	1.7	10.3	5.0
11.8	11.8	12.3	12.2	9.7	7.1	6.5	5.6	10.8	12.2	12.9	11.8	11.9	3.1	15.5	12.3
2.0	2.3	0.2	0.0	1.7	1.9	2.6	0.0	0.0	1.1	2.9	0.0	0.0	0.2	2.3	0.0
2.7	0.5	9.2	27.4	0.0	12.4	0.6	33.3	51.4	18.9	0.4	7.5	35.5	3.1	0.8	25.8
4.5	4.5	3.9	5.0	9.1	11.4	13.5	5.6	5.4	8.8	8.8	6.5	9.4	0.9	5.4	3.3
49.5	48.9	56.3	54.1	41.7	43.8	39.4	61.1	54.1	44.8	42.9	60.2	41.8	9.4	49.1	36.3
36.0	34.8	44.0	48.1	29.1	29.5	23.2	61.1	40.5	36.6	27.5	32.3	44.7	8.3	37.7	36.7
27.3	27.4	27.3	26.0	31.4	31.9	36.1	27.8	16.2	27.9	27.9	24.7	28.9	5.0	23.0	22.0
5.8	6.2	2.6	2.2	6.9	3.3	3.2	0.0	5.4	3.5	3.8	4.3	3.1	0.5	4.4	0.7
76.1	78.0	74.5	54.0	73.7	71.4	76.8	83.3	43.2	60.5	70.4	72.0	49.4	12.0	63.8	44.8
27.3	29.9	14.7	1.1	37.1	28.1	36.8	11.1	0.0	16.6	35.4	23.7	0.6	2.9	25.1	2.1
8.1	8.6	5.7	3.0	9.7	12.9	14.8	16.7	2.7	5.8	9.6	7.5	2.5	1.0	7.2	1.7
3.3	3.1	3.3	5.6	4.0	3.8	3.2	5.6	5.4	5.5	2.9	3.2	8.2	0.9	3.9	3.6
2.1	2.0	2.3	3.1	1.7	4.3	5.2	0.0	2.7	3.4	3.3	0.0	4.4	79.9	12.4	7.6
22.9	22.2	24.8	29.7	27.4	21.9	20.6	33.3	21.6	26.2	20.0	23.7	31.8	6.1	25.6	29.6
74.7	75.6	70.1	65.9	70.3	74.3	74.2	66.7	78.4	70.0	77.5	71.0	64.2	13.8	63.0	60.2
44.6	45.0	43.5	39.6	51.4	46.2	46.5	38.9	48.6	41.9	40.4	47.3	41.5	7.7	36.2	32.9
14.7	14.8	18.3	13.1	7.4	10.0	9.7	5.6	13.5	12.2	16.3	15.1	8.5	3.1	16.3	11.1
7.2	7.3	2.1	7.8	5.7	10.0	9.7	5.6	13.5	8.2	9.6	2.2	9.1	1.5	5.4	7.8
5.2	5.6	2.6	1.7	1.7	5.7	6.5	11.1	0.0	4.7	7.5	4.3	2.5	0.5	2.1	2.1
3.1	3.0	3.6	3.7	4.0	2.4	1.9	5.6	2.7	2.9	3.8	2.2	2.5	1.1	3.1	6.2
2.4	2.1	5.1	4.4	2.3	3.8	5.2	0.0	0.0	3.8	2.5	5.4	4.1	80.1	11.4	10.2
17.7	17.7	15.2	19.4	23.4	17.6	18.1	16.7	16.2	16.6	15.0	17.2	17.9	4.0	18.6	17.5
5.1	4.5	9.6	10.3	4.0	4.3	2.6	16.7	5.4	9.6	5.0	6.5	13.8	2.2	7.0	12.1
56.5	57.8	43.7	46.7	53.7	55.2	55.5	55.6	54.1	50.2	52.5	43.0	50.6	9.7	46.8	40.0
18.2	17.9	26.4	19.2	16.6	19.0	18.7	11.1	24.3	19.8	25.0	28.0	13.5	4.1	16.3	20.1
88.4	92.2	79.4	34.5	89.4	79.3	94.2	50.0	30.0	55.9	81.7	85.0	29.2	56.1	84.5	27.2
5.0	1.2	12.7	58.0	0.0	14.7	2.3	10.0	70.0	35.0	2.4	12.5	65.2	28.8	2.8	56.8
6.7	6.5	7.9	7.5	10.6	6.0	3.5	40.0	0.0	9.1	15.9	2.5	5.6	15.1	12.7	16.0

SOURCE: National Research Council, Survey of Earned Doctorates.

APPENDIX TABLE A-5 Sources of Graduate School Support for Doctorate Recipients, by Gender and Broad Field, 1989

Sources of Support in Graduate School		Total		Physical Sciences		Engineering		Life Sciences		Social Sciences		Humanities		Education		Prof./Other Fields	
		Men/Women		Men/Women		Men/Women		Men/Women		Men/Women		Men/Women		Men/Women		Men/Women	
NSF Research Ass't	N	1408	319	751	148	426	43	134	67	71	36	8	9	11	13	7	3
	V%*	7.3	2.8	18.8	15.8	11.5	12.1	3.8	3.0	2.6	1.6	0.5	0.6	0.5	0.4	0.6	0.4
	H%	100.0	100.0	53.3	46.4	30.3	13.5	9.5	21.0	5.0	11.3	0.6	2.8	0.8	4.1	0.5	0.9
NIH Research Ass't	N	729	443	198	57	56	10	428	309	43	52	1	3	1	8	2	4
	V	3.8	3.9	5.0	6.1	1.5	2.8	12.0	13.8	1.6	2.2	0.1	0.2	0.0	0.2	0.2	0.6
	H	100.0	100.0	27.2	12.9	7.7	2.3	58.7	69.8	5.9	11.7	0.1	0.7	0.1	1.8	0.3	0.9
Other Federal Research Ass't	N	1099	340	437	97	347	33	204	91	67	51	6	8	26	46	12	14
	V	5.7	3.0	11.0	10.3	9.4	9.3	5.7	4.1	2.4	2.2	0.4	0.5	1.1	1.4	1.0	2.0
	H	100.0	100.0	39.8	28.5	31.6	9.7	18.6	26.8	6.1	15.0	0.5	2.4	2.4	13.5	1.1	4.1
NSF Fellowship	N	290	149	97	21	53	6	71	59	53	49	6	1	8	11	2	2
	V	1.5	1.3	2.4	2.2	1.4	1.7	2.0	2.6	1.9	2.1	0.4	0.1	0.3	0.3	0.2	0.3
	H	100.0	100.0	33.4	14.1	18.3	4.0	24.5	39.6	18.3	32.9	2.1	0.7	2.8	7.4	0.7	1.3
NIH Traineeship	N	646	642	29	9	19	10	498	453	90	129	1	1	3	30	6	10
	V	3.3	5.7	0.7	1.0	0.5	2.8	14.0	20.2	3.2	5.6	0.1	0.1	0.1	0.9	0.5	1.4
	H	100.0	100.0	4.5	1.4	2.9	1.6	77.1	70.6	13.9	20.1	0.2	0.2	0.5	4.7	0.9	1.6
Other Dept of Health/Human Services	N	81	157	4	1	2	1	40	71	28	58	1	1	3	21	3	4
	V	0.4	1.4	0.1	0.1	0.1	0.3	1.1	3.2	1.0	2.5	0.1	0.1	0.1	0.6	0.2	0.6
	H	100.0	100.0	4.9	0.6	2.5	0.6	49.4	45.2	34.6	36.9	1.2	0.6	3.7	13.-	3.7	2.5
Department of Education	N	257	290	25	24	17	10	32	45	76	58	69	62	29	74	9	17
	V	1.3	2.6	0.6	2.6	0.5	2.8	0.9	2.0	2.7	2.5	4.1	4.3	1.2	2.3	0.7	2.5
	H	100.0	100.0	9.7	8.3	6.6	3.4	12.5	15.5	29.6	20.0	26.8	21.4	11.3	25.5	3.5	5.9
GI Bill	N	441	82	45	3	43	1	42	23	70	26	59	9	131	18	51	2
	V	2.3	0.7	1.1	0.3	1.2	0.3	1.2	1.0	2.5	1.1	3.5	0.6	5.4	0.5	4.1	0.3
	H	100.0	100.0	10.2	3.7	9.8	1.2	9.5	28.0	15.9	31.7	13.4	11.0	29.7	22.0	11.6	2.4
Other Federal Support	N	601	304	115	27	149	25	99	60	108	76	70	38	36	61	24	17
	V	3.1	2.7	2.9	2.9	4.0	7.0	2.8	2.7	3.9	3.3	4.1	2.6	1.5	1.9	1.9	2.5
	H	100.0	100.0	19.1	8.9	24.8	8.2	16.5	19.7	18.0	25.0	11.6	12.5	6.0	20.1	4.0	5.6
Foreign Government	N	1270	245	198	27	390	15	287	66	162	35	60	39	88	48	85	15
	V	6.5	2.2	5.0	2.9	10.5	4.2	8.1	2.9	5.8	1.5	3.5	2.7	3.6	1.5	6.8	2.2
	H	100.0	100.0	15.6	11.0	30.7	6.1	22.6	26.9	12.8	14.3	4.7	15.9	6.9	19.6	6.7	6.1
National Fellowship (nonfederal)	N	886	560	195	50	159	30	134	117	179	127	442	127	34	66	43	43
	V	4.6	5.0	4.9	5.3	4.3	8.5	3.8	5.2	6.5	5.5	8.3	8.7	1.4	2.0	3.4	6.2
	H	100.0	100.0	22.0	8.9	17.9	5.4	15.1	20.9	20.2	22.7	16.0	22.7	3.8	11.8	4.9	7.7
Univ Teaching Ass't	N	10146	5234	2957	723	1704	159	1363	891	1666	1238	1206	1074	564	788	686	361
	V	52.3	46.4	74.2	77.0	46.1	44.8	38.3	39.8	60.1	53.5	70.9	73.7	23.3	24.0	54.5	52.2
	H	100.0	100.0	29.1	13.8	16.8	3.0	13.4	17.0	16.4	23.7	11.9	20.5	5.6	15.1	6.8	6.9
Univ Research Ass't	N	8474	3533	2242	526	2360	237	1783	996	1032	824	258	211	356	516	443	223
	V	43.7	31.3	56.2	56.0	63.8	66.8	50.1	44.5	37.2	35.6	15.2	14.5	14.7	15.7	35.2	32.3
	H	100.0	100.0	26.5	14.9	27.8	6.7	21.0	28.2	12.2	23.3	3.0	6.0	4.2	14.6	5.2	6.3
University Fellowship	N	3753	2372	755	200	582	98	635	476	701	548	650	568	196	327	234	155
	V	19.3	21.0	18.9	21.3	15.7	27.6	17.9	21.3	25.3	23.7	38.2	39.0	8.1	10.0	18.6	22.4
	H	100.0	100.0	20.1	8.4	15.5	4.1	16.9	20.1	18.7	23.1	17.3	23.9	5.2	13.8	6.2	6.[illegible]
Other Univ-Related	N	1436	1273	177	64	170	17	253	221	271	319	222	186	251	397	92	6[illegible]
	V	7.4	11.3	4.4	6.8	4.6	4.8	7.1	9.9	9.8	13.8	13.0	12.8	10.4	12.1	7.3	10.0
	H	100.0	100.0	12.3	5.0	11.8	1.3	17.6	17.4	18.9	25.1	15.5	14.6	17.5	31.2	6.4	5.4
Business/ Employer Funds	N	1006	572	168	51	272	20	102	87	83	74	51	37	253	262	77	41
	V	5.2	5.1	4.2	5.4	7.4	5.6	2.9	3.9	3.0	3.2	3.0	2.5	10.5	8.0	6.1	5.9
	H	100.0	100.0	16.7	8.9	27.0	3.5	10.1	15.2	8.3	12.9	5.1	6.5	25.1	45.8	7.7	7.2
Own Earnings	N	9671	7070	1076	217	1221	99	1364	940	1851	1571	1208	975	2111	2775	840	493
	V	49.9	62.7	27.0	23.1	33.0	27.9	38.4	42.0	66.7	67.9	71.0	66.9	87.3	84.6	66.7	71.3
	H	100.0	100.0	11.1	3.1	12.6	1.4	14.1	13.3	19.1	22.2	12.5	13.8	21.8	39.3	8.7	7.0
Spouse's Earnings	N	4177	3202	591	154	505	50	852	539	745	780	532	480	570	992	382	207
	V	21.5	28.4	14.8	16.4	13.7	14.1	24.0	24.1	26.9	33.7	31.3	32.9	23.6	30.2	30.3	30.0
	H	100.0	100.0	14.1	4.8	12.1	1.6	20.4	16.8	17.8	24.4	12.7	15.0	13.6	31.0	9.1	6.5
Family Support	N	4645	2529	773	158	1009	65	821	506	888	699	496	412	332	540	326	149
	V	23.9	22.4	19.4	16.8	27.3	18.3	23.1	22.6	32.0	30.2	29.1	28.3	13.7	16.5	25.9	21.6
	H	100.0	100.0	16.6	6.2	21.7	2.6	17.7	20.0	19.1	27.6	10.7	16.3	7.1	21.4	7.0	5.9
Guaranteed Student Loans	N	4086	3122	553	154	309	40	808	509	1041	1044	533	435	513	719	329	221
	V	21.1	27.7	13.9	16.4	8.4	11.3	22.7	22.7	37.5	45.1	31.3	29.9	21.2	21.9	26.1	32.0
	H	100.0	100.0	13.5	4.9	7.6	1.3	19.8	16.3	25.5	33.4	13.0	13.9	12.6	23.0	8.1	7.1
Nat'l Direct Student Loans	N	764	637	53	18	35	5	108	64	253	252	161	113	93	137	61	48
	V	3.9	5.6	1.3	1.9	0.9	1.4	3.0	2.9	9.1	10.9	9.5	7.8	3.8	4.2	4.8	6.9
	H	100.0	100.0	6.9	2.8	4.6	0.8	14.1	10.0	33.1	39.6	21.1	17.7	12.2	21.5	8.0	7.5
Other Loans	N	556	442	63	15	83	10	63	68	138	119	79	59	88	143	42	28
	V	2.9	3.9	1.6	1.6	2.2	2.8	1.8	3.0	5.0	5.1	4.6	4.0	3.6	4.4	3.3	4.1
	H	100.0	100.0	11.3	3.4	14.9	2.3	11.3	15.4	24.8	26.9	14.2	13.3	15.8	32.4	7.6	6.3
Other Sources	N	589	450	99	16	90	13	105	91	90	101	68	50	80	147	57	32
	V	3.0	4.0	2.5	1.7	2.4	3.7	3.0	4.1	3.2	4.4	4.0	3.4	3.3	4.5	4.5	4.6
	H	100.0	100.0	16.8	3.6	15.3	2.9	17.8	20.2	15.3	22.4	11.5	11.1	13.6	32.7	9.7	7.1
Unduplicated Total†	N	19396	11275	3987	939	3699	355	3556	2238	2774	2314	1702	1457	2419	3281	1259	691

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix A.

*V% denotes vertical percentage; H% denotes horizontal percentage.
†The 3,648 Ph.D.s who did not report sources of support are omitted from this table.

SOURCE: National Research Council, Survey of Earned Doctorates.

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APPENDIX TABLE A-6 State of Doctoral Institution of Doctorate Recipients, by Gender and Broad Field, 1989

	Total		Physical Sciences		Engineering		Life Sciences		Social Sciences		Humanities		Education		Prof./Other Fields	
	Men/Women		Men/Women		Men/Women		Men/Women		Men/Women		Men/Women		Men/Women		Men/Women	
US Total*	21809	12510	4434	1026	4163	373	3917	2426	3263	2692	1940	1618	2660	3605	1432	770
Alabama	192	149	37	7	40	5	43	42	19	24	7	9	27	56	19	6
Alaska	8	5	6	1	0	0	2	3	0	1	0	0	0	0	0	0
Arizona	374	180	101	18	72	4	64	36	32	29	26	22	50	63	29	8
Arkansas	61	35	6	1	5	1	19	7	6	2	0	3	15	17	10	4
California	2664	1465	610	151	606	55	436	271	466	462	229	201	182	263	135	62
Colorado	412	209	95	25	87	8	67	38	57	44	29	23	58	56	19	15
Connecticut	314	223	84	28	33	4	43	39	62	44	67	56	17	43	8	9
Delaware	74	38	28	7	24	2	7	2	8	12	3	6	3	6	1	3
Dist.Columbia	268	213	30	13	34	2	27	35	80	60	42	43	18	42	37	18
Florida	638	472	98	29	77	8	94	51	76	96	51	41	180	221	62	26
Georgia	430	305	59	17	77	6	104	56	61	52	21	33	63	122	45	19
Hawaii	104	58	31	5	2	0	29	15	27	24	12	9	3	5	0	0
Idaho	50	11	15	1	15	0	11	3	0	0	1	0	8	7	0	0
Illinois	1246	678	263	50	238	16	168	129	223	163	127	99	149	163	78	58
Indiana	640	289	134	30	141	13	106	48	81	42	66	59	61	72	51	25
Iowa	398	187	66	18	74	3	98	37	44	32	37	25	58	62	21	10
Kansas	251	128	33	7	35	3	82	34	38	20	23	18	34	43	6	3
Kentucky	177	89	14	4	18	0	55	19	26	24	21	9	15	27	28	6
Louisiana	250	131	49	17	27	2	61	31	22	28	26	13	20	27	45	13
Maine	21	15	4	0	4	1	2	3	8	6	0	1	3	4	0	0
Maryland	391	295	80	21	78	6	91	96	58	55	31	33	39	66	14	18
Mass.	1250	674	309	69	261	30	177	123	182	121	107	78	145	219	69	34
Michigan	835	359	144	25	173	12	147	67	130	80	77	51	104	102	60	22
Minnesota	364	174	64	10	68	7	107	39	49	45	30	27	30	29	16	17
Mississippi	155	90	10	3	16	0	38	10	19	15	10	2	45	56	17	4
Missouri	375	187	50	12	66	3	83	29	47	46	37	21	62	62	30	14
Montana	35	22	15	2	2	0	8	1	3	5	0	0	7	14	0	0
Nebraska	160	87	28	0	10	0	36	17	31	13	7	5	30	47	18	5
Nevada	19	16	4	2	2	0	4	1	3	4	1	1	5	8	0	0
New Hampshire	38	27	15	7	3	0	9	7	8	10	3	2	0	1	0	0
New Jersey	415	241	113	24	87	14	58	39	58	52	57	37	30	62	12	13
New Mexico	144	74	45	10	28	3	24	9	14	19	9	8	22	25	2	0
New York	2022	1441	433	115	324	35	318	264	380	346	233	217	209	367	125	97
N. Carolina	501	274	83	15	93	11	152	73	63	56	47	38	45	65	18	16
North Dakota	45	18	18	3	3	0	16	6	5	3	1	0	2	6	0	0
Ohio	943	511	173	24	222	24	151	91	107	101	86	61	149	160	55	50
Oklahoma	217	142	23	7	47	2	41	23	32	22	11	10	50	67	13	11
Oregon	255	139	40	10	26	2	70	27	38	25	14	13	55	59	12	3
Pennsylvania	1201	707	220	53	280	26	148	108	174	129	110	100	159	236	110	55
Rhode Island	144	78	67	19	29	4	11	14	16	10	20	31	0	0	1	0
S. Carolina	188	109	30	11	30	4	50	23	15	13	4	8	40	44	19	6
South Dakota	33	14	1	0	2	0	9	4	7	2	0	0	14	8	0	0
Tennessee	281	234	24	6	40	3	51	37	46	56	31	22	64	100	25	10
Texas	1394	789	289	74	297	26	218	188	164	119	109	86	175	243	142	53
Utah	267	100	46	3	67	3	38	28	48	21	10	7	48	31	10	7
Vermont	22	26	5	4	1	2	11	5	3	8	1	4	1	3	0	0
Virginia	496	260	98	27	128	14	100	56	59	49	25	12	62	85	24	17
Washington	373	210	93	18	51	4	96	60	56	37	27	34	36	43	14	14
West Virginia	70	42	11	1	17	0	15	10	10	7	1	0	16	24	0	0
Wisconsin	543	254	123	18	96	5	110	71	87	45	50	35	46	62	31	18
Wyoming	50	9	14	2	7	0	12	0	11	1	0	0	6	6	0	0
Puerto Rico	11	27	3	2	0	0	0	1	4	12	3	5	0	6	1	1

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix A.

*Includes the 50 states, the District of Columbia, and Puerto Rico.

SOURCE: National Research Council, Survey of Earned Doctorates.

APPENDIX TABLE A-7 Institutions Granting Doctorates, by Major Field, 1989

	1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos., and Marine Sci.	Math and Computer Sci.	Engineering	Biosciences	Health Sciences	Agricultural Sciences	Psychology	Other Social Sciences	History	Eng. and Amer. Lang. and Lit.	Other Humanities	Education	Professional/ Other Fields
TOTAL ALL INSTITUTIONS*	34319	1278	1971	738	1473	4536	4106	985	1252	3209	2746	535	721	2302	6265	2202
ALABAMA																
Auburn University	114	3	6		3	22	2	1	18	22	2	3	2		29	1
Univ of Alabama-Birmingham	75	1	3		3	2	22	30		7					5	2
Univ of Alabama-Huntsville	19	2			8	9										
Univ of Alabama-University	126	4	9	1	1	12	5			9	3	1	6	4	49	22
Univ of South Alabama	7						6	1								
ALASKA																
Univ of Alaska	13	1		5	1		3	1	1		1					
ARIZONA																
Arizona State Univ	194	9	12	1	6	35	13	3		17	6	4	6	13	52	17
Northern Arizona Univ	39						5					2			32	
Univ of Arizona	321	35	29	11	16	41	40	14	25	20	18	1	2	20	29	20
ARKANSAS																
U of Arkansas-Fayetteville	84	2	2		3	6	5		9	8		1	2		32	14
U of Arkansas-Med Sci Camp	12						12									
CALIFORNIA																
Biola Univ	7									4					3	
Cal Inst Integral Studies	24									22				2		
Cal Inst of Technology	134	27	30	14	10	39	11				3					
Cal Sch Prof Psych-Alameda	61									61						
Cal Sch Prof Psych-Fresno	21									21						
Cal Sch Prof Psych-LA	112									112						
Cal Sch Prof Psych-San Diego	50									50						
Claremont Graduate School	67						1			10	6	1	2	10	30	7
Fielding Institute	50									40	1				1	8
Fuller Theological Seminary	25									13	3			2		7
Golden Gate Baptist Theo Sem	4													1		3
Golden Gate Univ																
Graduate Theological Union	18											2		4		12
Loma Linda Univ	27						9	7							11	
Naval Postgraduate School	4				3	1										
Pacific Grad Sch of Psych	9									9						
Pepperdine Univ	30														30	
Rand Grad Sch Policy Studies	14										13					1
Saybrook Institute	5									5						
Stanford Univ	537	47	20	20	39	173	38	3	4	12	51	11	9	36	53	21
U.S. International Univ	137									89	1			1	20	26
Univ of California-Berkeley	866	38	67	13	72	201	104	34	26	27	101	22	16	56	47	42
Univ of California-Davis	270	5	31	5	12	35	119	7	24	6	10	4	4	8		
Univ of California-Irvine	107	9	11		8	21	21	1		4	13	2	4	6		7
Univ of Calif-Los Angeles	491	26	30	22	22	59	80	20		24	54	26	11	66	37	14
Univ of Calif-Riverside	83	4	7		2		26		12	5	11	2	3	5	6	
Univ of Calif-San Diego	194	17	15	17	15	27	49			7	23	7	5	12		
Univ of Calif-San Francisco	72		11		1	1	28	23		2	6					
Univ of Calif-Santa Barbara	173	18	8	9	5	23	25	1		16	14	9	1	24	20	
Univ of Calif-Santa Cruz	46	7	2	7	4		10			5		6	1	4		
Univ of La Verne	13														10	3
Univ of the Pacific	12						1	2							9	
Univ of San Diego	18							1							17	
Univ of San Francisco	67														67	
Univ of Santa Clara	1					1										
Univ of Southern California	360	4	16	4	7	80	18	2		27	27	4	3	38	84	46
Wright Institute, The	20									20						
COLORADO																
Colorado School of Mines	43	2	1	14		13					10					3
Colorado State Univ	173	3	11	10	11	35	36	4	27	11	5				16	4
Univ of Colorado	268	20	20	13	6	47	28	6		22	26	2	5	23	35	15
Univ of Denver	78	1	3				4			12	8		6	8	24	12
Univ of Northern Colorado	59				5					4	3			8	39	
CONNECTICUT																
Univ of Connecticut	197	2	18		10	19	25	1	1	26	19	1	2	12	60	1
Univ of Hartford	3													3		
Wesleyan Univ	20		7		4		6							3		
Yale Univ	317	23	26	3	19	18	35	9	5	19	42	6	11	85		16
DELAWARE																
Univ of Delaware	112	3	13	8	11	26	7	1	1	9	11	3	1	5	9	4
DISTRICT OF COLUMBIA																
American Univ	71	3	3		1		1			7	37	2		4	13	
Catholic Univ of America	111	6	1			7	2	14		16	8	3	2	22	4	26
George Washington Univ	157	1	2	1	7	27	13	1		14	21	2	3	6	41	18
Georgetown Univ	81	2	6				22				15	7		29		
Howard Univ	61	1	5		4	2	9			9	13	3	1	1	2	11

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix A.
*Includes the 50 states, the District of Columbia, and Puerto Rico.

	1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos., and Marine Sci	Math and Computer Sci	Engineering	Biosciences	Health Sciences	Agricultural Sciences	Psychology	Other Social Sciences	History	Eng. and Amer. Lang. and Lit.	Other Humanities	Education	Professional/ Other Fields
FLORIDA																
Barry Univ	4															4
Florida Atlantic Univ	18					5				1					12	
Florida Inst of Technology	13	1		1		3	2			5					1	
Florida International Univ	5														5	
Florida State Univ	249	7	6	7	8		14	2		30	21	6	8	28	75	37
Nova Univ	282			1	12					11	3				227	28
Univ of Central Florida	21				7	2									12	
Univ of Florida	342	13	34	2	5	60	48	13	42	32	21	3	8	7	36	18
Univ of Miami	102	1	5	7	2	9	13	2		28	1	2	7	15	9	1
Univ of South Florida	74		4	2	2	6	8	1		17	2		8		24	
GEORGIA																
Clark Atlanta Univ	33						5			1	12				11	4
Emory Univ	108	3	16		2		25			16	5	4	9	23	2	3
Georgia Inst of Technology	122	2	9	5	13	78	6	1		3						5
Georgia State Univ	106						3			25	4				50	24
Medical College of Georgia	15						15									
Univ of Georgia	340	1	15	2	3		67	3	34	32	15	2	4	12	122	28
HAWAII																
Univ of Hawaii at Manoa	162	9	10	13	4	2	22	9	13	9	42	7		14	8	
IDAHO																
Idaho State Univ	4				1		1						1		1	
Univ of Idaho	57	3	3	4	5	15	5		8						14	
ILLINOIS																
DePaul Univ	11									11						
Illinois Inst of Technology	38	1	2		5	18	2			9						1
Illinois State Univ-Normal	43				1		1	1				2	4		34	
Loyola Univ of Chicago	84		5				8			21	4	4	8	1	33	
Lutheran Sch of Theol-Chicgo	3															3
Northern Illinois Univ	97		4	1	1		1			6	9	2	3		69	1
Northwestern Univ	357	9	18	6	38	74	30	5		40	42	6	6	34	12	37
Rush Univ	10						4	4		2						
Southern Ill Univ-Carbondale	147		6	1	4		11	3	2	24	15		4	5	59	13
Southern Ill Univ-Edwardsvle	6														6	
Univ of Chicago	310	25	21	6	10		43			22	64	16	8	49	12	34
U of Health Sci-Chicago Med	14			1			2			11						
U of Ill-Chicago	157	1	13		10	26	33	21		12	15	1	1	9	7	8
U of Ill-Urbana-Champaign	647	40	40	9	35	136	71	5	50	29	50	4	6	53	80	39
INDIANA																
Ball State Univ	59						1			12	1	1	2	7	35	
Grace Theological Seminary	1															1
Indiana State Univ	20						3			7	2				8	
Indiana Univ-Bloomington	328	12	21	2	10		37	5		8	38	8	17	56	67	47
Indiana Univ Sch of Medicine	4							4								
Purdue Univ	418	20	53	3	24	132	46	10	37	15	17	2	5	9	23	22
Univ of Notre Dame	99	6	7		6	22	11			6	17	4	6	8		6
IOWA																
Drake Univ	12												2		10	
Iowa State Univ	267	13	22	7	14	56	30	2	46	8	25				42	2
Maharishi Intl Univ	8	2					3			3						
Univ of Northern Iowa	11														7	4
Univ of Iowa	287	4	15	1	6	21	35	19		23	17	2	11	47	61	25
KANSAS																
Kansas State Univ	137	1	11		9	8	24	1	36	3	4	3			36	1
Univ of Kansas	224	4	9	3	3	17	42	8		33	18	3	2	33	41	8
Wichita State Univ	18					13		5								
KENTUCKY																
Southern Bapt Theolog Semin	37											2		12	7	16
Univ of Kentucky	182	3	7	2	4	14	24	8	25	23	14	3	2	8	27	18
Univ of Louisville	47		2			4	17			12	1		1	2	8	
LOUISIANA																
Grambling St Univ	2														2	
Louisiana St U & A&M College	206	5	18	8	17	14	24	8	24	19	12	3	3	12	21	18
Louisiana St U Med-New Orlns	7						6	1								
Louisiana St U Med-Shreveprt	3						3									
Louisiana Tech Univ	25					9										16
New Orleans Bapt Theolog Sem	37													7	10	20
Northeast Louisiana Univ	5						3	2								
Northwestern St Univ of LA	3														3	
Tulane Univ of Louisiana	63	1	2		2	5	8	12		8	9	7	2	4		3
Univ of New Orleans	15		1							1	1				11	1
U of Southwestern Louisiana	15				12	1	1						1			

APPENDIX TABLE A-7 (Continued)

	1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos., and Marine Sci.	Math and Computer Sci.	Engineering	Biosciences	Health Sciences	Agricultural Sciences	Psychology	Other Social Sciences	History	Eng. and Amer. Lang. and Lit.	Other Humanities	Education	Professional/ Other Fields
MAINE																
Univ of Maine	36	1	3			5	2		3	13	1	1			7	
MARYLAND																
Johns Hopkins Univ	228	11	13	7	8	27	60	40		3	27	12	4	10	6	
Morgan State Univ	3														3	
Peabody Inst Johns Hopkins	5													5		
St. Mary's Sem. & Univ	4															4
Uniformed Serv U of Hlth Sci	8						7			1						
U of Maryland-Baltimore Cnty	13				2		6			3	1			1		
U of Maryland-College Park	392	18	11	5	24	57	34	2	16	42	36	6	7	19	96	19
U of Maryland-Eastern Shore	1			1												
U of Maryland Sch of Med	32		1				11	11								9
MASSACHUSETTS																
American Internatl College	4														4	
Boston College	92	2	2				5			13	7	1	2	11	44	5
Boston Univ	299	13	4	2	10	3	27	31		28	32	3	4	26	94	22
Brandeis Univ	70	7	5		6		18	1		1	18	5	3	4		2
Clark Univ	25	1					1			7	13				3	
Harvard Univ	456	21	17	10	18	4	78	22		6	63	16	13	63	95	30
Mass Coll Pharm & Health Sci	2							2								
Mass Inst of Technology	492	41	28	33	49	217	47	6		5	42			8	1	15
Northeastern Univ	53	3	12		3	9	2			5	5				14	
Simmons College	3															3
Smith College	5															5
Springfield College	2														2	
Tufts Univ	50	2	4			4	14	1		4	13	1	5	2		
Univ of Lowell	22	4	11			1	2								4	
Univ of Mass-Amherst	329	9	33	5	18	43	16	6	16	17	24		4	14	103	21
Univ of Mass-Boston	2			2												
U Mass-Med School-Worcester	5						3	2								
Worcester Polytechnic Inst	13		1		2	10										
MICHIGAN																
Andrews Univ	19									1				2	11	5
Michigan State Univ	421	7	26	6	20	38	56	3	60	29	41	4	17	12	72	30
Michigan Technological Univ	13	2	1	1		7	1		1							
Oakland Univ	6	2	1			3										
Univ of Detroit	11		1			3				7						
Univ of Michigan	527	14	25	8	19	122	48	19	1	34	57	9	15	61	54	41
Wayne State Univ	145	6	19		5	12	20	5		13	11	1	2	5	41	5
Western Michigan Univ	52		1		5					14	3				28	1
MINNESOTA																
Univ of Minnesota-Minneapls	538	12	26	8	28	75	66	30	50	52	42	3	9	45	59	33
MISSISSIPPI																
Delta State Univ	2														2	
Jackson State Univ	7														7	
Mississippi State Univ	85		2		1	9	6	1	19	1	2	4			31	9
Univ of Mississippi	63	3	2			7	2	6		9			2	1	21	10
U of Mississippi-Med Center	8						8									
Univ of Southern Mississippi	80		5				5	1		21	1	1		4	40	2
MISSOURI																
Concordia Seminary	2															2
Midwest Bapt Theolog Semin	17													10		7
St. Louis Univ	91			8	1		13	3		20	1	1	2	5	26	11
U of Missouri-Columbia	236	1	3	3	3	28	30	3	27	18	8	3	8	6	76	19
U of Missouri-Kansas City	41		2					4		14				9	12	
U of Missouri-Rolla	39	2	6		6	25										
U of Missouri-St. Louis	18		4							6					8	
Washington University	118	3	9	4	7	16	32			7	19	1	1	12	2	5
MONTANA																
Montana State Univ	38	6	6		1	2	3		3		1				16	
Univ of Montana	19			2	2		3			7					5	
NEBRASKA																
Creighton Univ	3						3									
Univ of Nebraska-Lincoln	244	3	17	2	6	10	24	2	24	25	19		5	7	77	23
NEVADA																
Univ of Nevada-Las Vegas	7														7	
Univ of Nevada-Reno	28	1	2	3		2	5			7		1	1		6	
NEW HAMPSHIRE																
Dartmouth College	29	5	2	2	5	1	7			7						
Univ of New Hampshire	36	3	3	1	1	2	7		2	2	9	2	3		1	

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	1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos., and Marine Sci.	Math and Computer Sci.	Engineering	Biosciences	Health Sciences	Agricultural Sciences	Psychology	Other Social Sciences	History	Eng. and Amer. Lang. and Lit.	Other Humanities	Education	Professional/ Other Fields
NEW JERSEY																
Drew Univ	20											1	2	10		7
Fairleigh Dickinson Univ	12									12						
New Jersey Inst Technology	14					14										
Princeton Theolog Seminary	11													7		4
Princeton Univ	227	26	17	9	21	41	15			7	34	10	8	38		1
Rutgers St U-New Brunswick	298	11	18	10	9	31	51	8	12	17	22	9	3	6	80	11
Rutgers St U-Newark	16		6				1			5	2					2
Seton Hall Univ	22		2							8					12	
Stevens Inst of Technology	26	3	3		2	15				3						
U of Med & Dent of NJ	10						10									
NEW MEXICO																
New Mexico Inst Mining&Tech	17	4		10		3										
New Mexico State Univ	62	5	2		7	8	6		14	6					14	
Univ of New Mexico	139	9	8	5	5	20	11	2		22	5	1	5	11	33	2
NEW YORK																
Adelphi Univ	59				1			14		32						12
Alfred Univ	5					5										
City U of NY-Grad Sch/U Ctr	234	14	13	3	4	8	30	3		53	29	7	8	38	7	17
Clarkson Univ	32	2	3		2	25										
Columbia Univ	372	22	25	19	16	42	46	12		36	50	12	18	36	6	32
Columbia U-Teachers College	243														243	
Cornell Univ	471	30	37	9	24	88	70	4	74	15	39	3	8	39	16	15
Cornell Univ Medical College	14						14									
Fordham Univ	122						3			28	12	2	1	7	44	25
Hofstra Univ	62									47					15	
Jewish Theol Sem of America	8											1		6		1
The Juilliard School	12													12		
Long Island U-Brooklyn Camp	12									12						
Manhattan School of Music	8													8		
New School for Social Rsrch	44									22	22					
New York Medical College	13						13									
New York Univ	373	12	4	2	30	1	30	22		37	23	12	7	55	81	57
Pace Univ	5				1											4
Polytechnic Inst of New York	42	2	11		8	19										2
Rensselaer Polytechnic Inst	120	5	12	3	14	73					6			1		6
Rockefeller Univ	24	2					22									
St. John's Univ	48		1				8	3		17			6	1	12	
State Univ of NY-Albany	132	7	4	5	3		7			15	29		6	7	43	6
State Univ of NY-Binghamton	64		6		3	1	2			6	26	8	9	3		
State Univ of NY-Buffalo	279	6	19	1	9	41	39	17		22	17	4	19	15	56	14
SUNY Coll-Envirn Sci&Forstry	17		1	1			6		9							
SUNY College of Optometry	1							1								
SUNY-Hlth Sci Ctr-Brooklyn	7						6	1								
SUNY-Hlth Sci Ctr-Syracuse	5						5									
State Univ of NY-Stony Brook	189	14	19	16	11	15	31	2		23	16	5	13	22	2	
Syracuse Univ	166	7	10	2	13	24	7	2		12	28	1	1	10	36	13
Union Theological Seminary	7															7
Union Univ	4					2										2
Union U-Albany Med College	10						10									
Univ of Rochester	208	22	21	3	14	15	38	7		11	18	3	6	30	14	6
Yeshiva Univ	27									23					1	3
Yeshiva U-Einstein Coll Med	24						22	2								
NORTH CAROLINA																
Duke Univ	148	5	11	1	7	23	42			10	13	9	9	13		5
East Carolina U-Sch of Med	5						5									
North Carolina St U-Raleigh	232	7	6	3	7	76	36	2	40	10	14				31	
U of N Carolina-Chapel Hill	299	9	21	8	13	5	61	26		25	32	14	14	22	27	22
U of N Carolina-Greensboro	82						4			12	3		3	1	52	7
Wake Forest Univ	9						9									
NORTH DAKOTA																
North Dakota State Univ	34	4	11			3	4		12							
Univ of North Dakota	29	1	4	1			5		1	8		1			8	
OHIO																
Air Force Inst of Technology	4	1				3										
Bowling Green State Univ	47				1			1		12	4		3	10	11	5
Case Western Reserve Univ	176	10	17		8	74	19	12		6	4	2	3	7		14
Cleveland State Univ	10		1			5	4									
Hebrew Union College	5											1		4		
Kent State Univ	117	5	2		2		11	2		22	15	2	7	3	30	16
Medical College of Ohio	14						12	2								
Miami Univ	37		4	1			6			9	1	2	5	1	8	
Ohio State Univ	602	21	26	5	27	97	85	8	32	38	37	7	13	25	141	40
Ohio Univ	97	5	1		2	5	7			16			6	2	30	23
Univ of Akron	80		19			17	1			10	4				29	
Univ of Cincinnati	196	4	21	6	5	26	25	6		15	11	6	4	29	31	7
Univ of Dayton	9					8	1									
Univ of Toledo	56		2		1	11	3	1		4		4	1		29	
Wright State Univ	4						4									

APPENDIX TABLE A-7 (Continued)

	1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos., and Marine Sci.	Math and Computer Sci.	Engineering	Biosciences	Health Sciences	Agricultural Sciences	Psychology	Other Social Sciences	History	Eng. and Amer. Lang. and Lit.	Other Humanities	Education	Professional/ Other Fields
OKLAHOMA																
Oklahoma State Univ	214	2	4	2	5	25	14		23	23	6	1	5	1	90	13
Univ of Oklahoma	134	3	7	4	3	21	17	10		11	14	1	2	10	20	11
Univ of Tulsa	11					3							1		7	
OREGON																
Oregon Graduate Center	10	3		1	1	4	1									
Oregon Health Sciences Univ	12						10			2						
Oregon State Univ	142	2	4	3	9	21	27		45	1	3				26	1
Portland State Univ	35	1	1	3		3					9				16	2
Univ of Oregon	195	10	4	1	7		13	1		19	29	2	5	20	72	12
PENNSYLVANIA																
Annenberg Research Inst	1										1					
Bryn Mawr College	32	1					3			8	1	1	1	12	1	4
Carnegie-Mellon Univ	158	6	6		24	76	7			6	8	9	1	7		8
Drexel Univ	43	5	3	1	1	24	2									7
Duquesne Univ	21		3					1		8			1	4		4
Hahnemann Univ	8						5			3						
Indiana Univ of Pennsylvania	16												6	5	5	
Lehigh Univ	92	3	4	2	9	38	7			2	3	1	3		18	2
Med College of Pensylvania	9						9									
Pennsylvania State Univ	427	9	37	14	19	95	40	8	19	30	26	5	6	16	73	30
Phila Coll of Pharm & Sci	8		4				2	2								
Temple Univ	292	2	5		6		21	4		51	11	5	6	18	148	15
Thomas Jefferson Univ	7						7									
Univ of Pennsylvania	420	24	20	2	14	42	66	6		24	73	8	11	54	29	47
Univ of Pittsburgh	363	12	23	2	10	31	20	26		22	26	1	4	24	121	41
Villanova Univ	2		2													
Westminster Theolog Semin	8													1		7
Widener Univ	1							1								
PUERTO RICO																
Caribbean Ctr Adv Studies	14									14						
Inter Amer U PR-Metropol	4														4	
Univ of Puerto Rico	20	1	4				1			2				8	2	2
RHODE ISLAND																
Brown Univ	147	17	15	10	23	10	10			5	13	3	13	28		
Univ of Rhode Island	75		4	13	4	23	10	1	4	8			6	1		1
SOUTH CAROLINA																
Clemson Univ	77	5	3		8	25	16		10		1				5	4
Medical Univ South Carolina	18						17	1								
South Carolina State College	17														17	
Univ of South Carolina	185	4	11	7	3	9	16	13		16	11	1	6	5	62	21
SOUTH DAKOTA																
S Dakota Sch of Mines & Tech	3			1		2										
South Dakota State Univ	10								9		1					
Univ of South Dakota	34						4			8					22	
TENNESSEE																
East Tennessee State Univ	5						1								4	
Geo Peabody Coll for Teachrs	83									5					78	
Meharry Medical College	5						4	1								
Memphis State Univ	64		2		1		3	2		17		1		3	26	9
Mid-America Bapt Theol Sem	2															2
Middle Tennessee State Univ	4												1		3	
Tennessee Technological Univ	6					6										
U of Tenn-Ctr for Health Sci	8						6	2								
Univ of Tennessee-Knoxville	209	6	7	2	3	21	29	2	13	25	16	2	12	5	47	19
Vanderbilt Univ	129	1	5		3	16	24	1		25	14	4	6	19	6	5
TEXAS																
Baylor College of Medicine	23						21	2								
Baylor Univ	25	4	4											8	7	2
Dallas Theological Seminary	6															6
East Texas State Univ	58									2					56	
Lamar Univ	1					1										
North Texas State Univ	150	1	7		10		11	1		14	6	2	2	11	66	19
Rice Univ	120	11	15	9	8	27	6			6	13	3	1	19		2
Sam Houston State Univ	9										9					
Southern Methodist Univ	45				10	21	1				11			2		
Southwestern Bapt Theol Sem	65											1		21	13	30
Stephen F Austin St Univ	4			1					3							
Texas A&I Univ	3														3	
Texas A&M Univ	421	3	34	20	13	98	43	2	57	18	24	4	4		80	21
Texas Christian Univ	11	1					1			6		3				
Texas Southern Univ	24														24	
Texas Tech Univ	141	1	8	2	1	16	11	1	17	20	6	1	1	8	33	15
Texas Woman's Univ	96						6	28		11	6		2	2	27	14
Univ of Dallas	6									6						
Univ of Houston	154	3	10	5	8	32	9			23	5	3	4	1	35	16

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix A.

	1989 Total	Physics and Astronomy	Chemistry	Earth, Atmos., and Marine Sci.	Math and Computer Sci.	Engineering	Biosciences	Health Sciences	Agricultural Sciences	Psychology	Other Social Sciences	History	Eng. and Amer. Lang. and Lit.	Other Humanities	Education	Professional/ Other Fields
TEXAS (continued)																
Univ of St. Thomas	1													1		
Univ of Texas-Arlington	68	2	11		17	18	1			2	2	1		6		8
Univ of Texas-Austin	580	36	31	14	20	107	37	51		20	57	5	11	66	74	51
Univ of Texas-Dallas	72	13	2	17	6	2	6	4		2	7			2		11
Univ of Texas-El Paso	5			5												
U Tex-Hlth Sci Ctr-Houston	43					1	23	19								
U Tex-Hlth Sci Ctr-San Anton	9						9									
U Tex-Med Brnch-Galveston	18						18									
U Tex-Southwestern Med Ctr	25						18			7						
UTAH																
Brigham Young Univ	118	3	4			20	6	2		14	4	2		3	59	1
Univ of Utah	174	3	14	7	10	37	15	18		21	13		2	10	9	15
Utah State Univ	75	2	2	3	1	13	15		10	11	6				11	1
VERMONT																
Middlebury College	5													5		
Univ of Vermont	43	1	8			3	16			11					4	
VIRGINIA																
College of William & Mary	32	3		5			1					1			22	
George Mason Univ	23				6	1	1	2			4				7	2
Old Dominion Univ	32	1	2	2	2	11	4			4	3				3	
Union Theological Seminary	2													2		
Univ of Virginia	241	12	20	2	8	33	33	10		27	15	3	17	14	46	1
Virginia Commonwealth Univ	40		6					1		15	9				3	6
VA Commonwlth U-Med Coll VA	37		2		1		30	4								
Virginia Polytch Inst & St U	349	11	20	7	15	97	21	1	48	17	14				66	32
WASHINGTON																
Gonzaga Univ	10														10	
Seattle Univ	19														19	
Univ of Washington	403	16	24	29	23	45	50	22	26	21	35	5	18	31	33	25
Washington State Univ	151	2	4	4	9	10	34	8	16	16	21	3	3	1	17	3
WEST VIRGINIA																
West Virginia Univ	112	5	5	2		17	14	6	5	10	7	1			40	
WISCONSIN																
Institute of Paper Chemistry	11		5			5			1							
Marquette Univ	34		4		1	2	4			2		1	1	5	11	3
Medical College of Wisconsin	10						10									
Univ of Wisconsin-Madison	688	30	41	23	30	98	88	13	57	22	86	15	12	44	88	41
Univ of Wisconsin-Milwaukee	65	2	6	1	3	1	4	5		8	14		5	2	9	5
WYOMING																
Univ of Wyoming	59	4	4	4	4	7	9		3	7	5				12	

Top 40 Doctorate-Granting Institutions, 1989

	Institution	Number of Doctorates		Institution	Number of Doctorates
1.	Univ of California-Berkeley	866	21.	Columbia Univ	372
2.	Univ of Wisconsin-Madison	688	22.	Univ of Pittsburgh	363
3.	Univ of Illinois-Urbana/Champaign	647	23.	Univ of Southern California	360
4.	Ohio State Univ	602	24.	Northwestern Univ	357
5.	Univ of Texas-Austin	580	25.	Virginia Polytech Inst & St U	349
6.	Univ of Minnesota-Minneapolis	538	26.	Univ of Florida	342
7.	Stanford Univ	537	27.	Univ of Georgia	340
8.	Univ of Michigan-Ann Arbor	527	28.	Univ of Massachusetts-Amherst	329
9.	Massachusetts Inst of Technology	492	29.	Indiana Univ-Bloomington	328
10.	Univ of California-Los Angeles	491	30.	Univ of Arizona	321
11.	Cornell Univ	471	31.	Yale Univ	317
12.	Harvard Univ	456	32.	Univ of Chicago	310
13.	Pennsylvania State Univ	427	33.	Boston Univ	299
14.	Michigan State Univ	421	34.	Univ of N Carolina-Chapel Hill	299
15.	Texas A&M Univ	421	35.	Rutgers St Univ-New Brunswick	298
16.	Univ of Pennsylvania	420	36.	Temple Univ	292
17.	Purdue Univ	418	37.	Univ of Iowa	287
18.	Univ of Washington	403	38.	Nova Univ	282
19.	Univ of Maryland-College Park	392	39.	State Univ of NY-Buffalo	279
20.	New York Univ	373	40.	Univ of California-Davis	270

SOURCE: National Research Council, Survey of Earned Doctorates.

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APPENDIX B: Trend Tables

Appendix B includes the following three tables containing trend data:

B-1 Number of Doctorate Recipients, by Subfield, 1979-1989
B-2 Number of Doctorate Recipients, by Gender, Race/Ethnicity, and Citizenship, 1979-1989
B-3 Countries of Origin of Non-U.S. Citizen Doctorate Recipients, 1960-1989

Table B-1: This table displays data for the most recent decade by subfield of doctorate. In general, the subfields correspond to the fields on the questionnaire's Specialties List located at the back of this report; some subfields, however, do not appear on the current Specialties List because they are no longer included in the survey taxonomy. Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates (SED). See inside the back cover for a description of field groupings as reported in these tables. The "general" field categories—e.g., "chemistry, general"—contain individuals who either received the doctorate in the general subject area or did not indicate a particular specialty field. The "other" field categories—e.g., "chemistry, other"—include individuals whose specified doctoral discipline was not included among the specialty fields.

The seven tables in Appendix A present additional information about the most recent cohort of Ph.D.s by field of doctorate.

Table B-2: Table B-2 presents data on the race/ethnicity of doctorate recipients in the last ten years, by gender and citizenship. There are three panels in this table, each displayed on a separate page. The first panel includes all doctorates; the remaining panels disaggregate the data by gender.

In 1977, the item on race/ethnicity in the survey questionnaire was revised to coincide with the question format recommended by the Federal Interagency Committee on Education and adopted by the Office of Management and Budget (OMB) for use in federally sponsored surveys; an explanation of the effect of these changes is detailed on page 13 of *Summary Report 1977*. Changes in the OMB guidelines prompted the moving of persons having origins in the Indian subcontinent from the white category to Asian in 1978. In 1980, two survey revisions were made: (1) the category Hispanic was subdivided into Puerto Rican, Mexican American, and "other" Hispanic to provide more detail for users of the racial/ethnic data, and (2) respondents were asked to check only one racial category (prior to 1980, doctorate recipients could check more than one category to indicate their race). However, when the data were compiled, all persons who checked Asian, American Indian, or Hispanic and also checked white were included in the minority-group category; and those whose responses were black as well as any other category were designated as black.

Beginning with the 1982 survey, this item was revised to separate questions on racial and ethnic groups. Respondents are first asked to check one of the four racial group categories (American Indian, Asian, black, or white) and then to indicate Hispanic heritage. For purposes of analysis, all respondents who indicated Hispanic heritage, regardless of racial identification, are included in one of three Hispanic groups. The remaining survey respondents are then counted in the respective racial groups.

It is possible to make rough comparisons between the racial/ethnic groups of Ph.D.s and the U.S. population even though the Census Bureau's method of data collection differs from the SED. According to the 1980 census, American Indians were 0.6 percent of the population, blacks were 11.7 percent, Hispanics were 6.4 percent, Asians were 1.5 percent, and whites were 83.1 percent; the percentages add to greater

than 100 percent because Hispanics were sometimes double-counted as blacks or whites.[1] The SED data in Table B-2 suggest that American Indians, blacks, and Hispanics are underrepresented relative to their proportions in the general population, and Asians and whites are overrepresented. The groups comprising the population closest to that counted by the Census Bureau are U.S. citizens and permanent residents.

Tables A-2 and A-4 in Appendix A present additional information about the most recent cohort of Ph.D.s by racial/ethnic group.

Table B-3: This table displays the countries of origin of non-U.S. doctorate recipients in five-year groupings from 1960 to 1989. Subtotals for the major regions are located throughout the table. At the end of the table, there are totals for the number of non-U.S. Ph.D.s with known country and the number with unknown country, as well as a grand total for all non-U.S. Ph.D.s.

The reader should pay heed to three considerations when interpreting the changing trends presented in Table B-3. First, in 1965 U.S. immigration and naturalization laws were amended to abolish the country quota system which had long discriminated against certain regions of the world. In its place, uniform restrictions were established for all countries, with a focus on the reunification of families and, to a lesser extent, employment skills in short supply in the United States. No limit was imposed on the number of "immediate" relatives (spouses, minor children, parents) of U.S. citizens who could be admitted. An annual limit of 270,000 was set for "preference system" visas issued to other relatives of U.S. citizens, all relatives of permanent residents in this country, individuals of distinguished merit in the arts and sciences, and workers with skills needed in the United States. No more than 20,000 "preference system" visas could be issued to any one country in a given year. Because all but a fraction of permanent visas since 1965 have been family-based, the law ultimately favored countries with newly arrived immigrants. While Asia and Latin America have benefited, many European countries whose immigration waves occurred in earlier years have been all but excluded.[2] The impact of these legislative changes on the composition of the non-U.S. doctoral pool was evident by the mid-1970s. Many European countries and some Asian countries showed noticeable decreases in numbers of U.S.-educated Ph.D.s from the 1970-1974 period to the 1975-1979 period, while other countries showed significant gains. Changing international relations, as well as domestic political situations, have also contributed to the fluctuation in numbers of doctorates among countries. The above discussion pertains only to permanent residents, a small proportion of all non-U.S. Ph.D.s. Nevertheless, since the countries of temporary visaholders tend to parallel those of permanent visaholders, the impact of the 1965 immigration legislation has been far-reaching.

A second consideration in analyzing trends is that certain countries were not identifiable in every year because specific codes for these countries did not always exist; this was particularly true in the 1960s and 1970s. Therefore, a dash in Table B-3 does not necessarily mean that there were no doctorate recipients from a country during that time period. If counts appear for a country in later years but there are dashes in all of the earlier years, the reader can assume that no code existed for that country in the early

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[1]Bureau of the Census, *1980 Census* (PC80-1-B1), Washington, D.C.: U.S. Government Printing Office, 1983, Chart 43: "Persons by Age, Race, Spanish Origin and Sex: 1980," pp. 27-36.

[2]Lawrence, C. C., ed. 1989. *The 45th Annual CQ Almanac: 1989.* 101st Congress, 1st session. Washington, D.C.: Congressional Quarterly, Inc.

years. In such cases, any doctorates awarded are included in the "unknown" category for the region (e.g., Cuba & Islands, Unknown; South Africa, Unknown).

The third consideration is one requiring special emphasis. Because response rates to the country of citizenship question have varied significantly through the years, some of the numbers shown in this table may be lower than if response rates had been more stable. More than one-third of non-U.S. citizen Ph.D.s in 1960 and 1961 did not report their country of citizenship. For the years 1962 through 1968, nonresponse rates ranged from 12 percent to 19 percent. Although the rate fell to about 4.5 percent in 1969 when the survey form was redesigned, it has continued to fluctuate from year to year over the past two decades. In 1989 the rate of nonresponse to the country of citizenship question was about 10.5 percent.

APPENDIX TABLE B-1 Number of Doctorate Recipients, by Subfield, 1979-1989

	Year of Doctorate										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
TOTAL ALL FIELDS	31239	31020	31357	31111	31282	31337	31297	31895	32356	33480	34319
PHYSICAL SCIENCES	4299	4111	4170	4291	4426	4452	4531	4807	5030	5310	5460
MATHEMATICS	769	744	728	720	701	698	688	729	740	749	861
Applied Mathematics	111	102	118	108	125	108	116	135	131	142	158
Algebra	88	78	56	60	55	65	55	46	57	54	50
Analysis & Functional Analysis	111	91	105	98	76	71	83	81	86	76	101
Geometry	25	35	29	32	44	27	35	38	30	44	47
Logic	21	24	18	17	21	25	30	23	18	20	12
Number Theory	17	28	24	28	19	27	18	20	15	26	23
Probability & Math Statistics	165	151	163	165	151	181	150	141	143	152	167
Topology	61	57	55	45	44	42	35	34	41	27	37
Computing Theory & Practice	25	13	16	11	12	13	15	10	14	12	12
Operations Research	43	41	36	36	20	27	22	29	22	29	22
Mathematics, General	80	83	77	84	86	78	85	125	137	134	181
Mathematics, Other	22	41	31	36	48	34	44	47	46	33	51
COMPUTER SCIENCE	210	218	232	220	286	295	310	399	450	515	612
Computer Sciences	210	218	232	220	264	256	249	355	384	442	519
Information Sciences & Systems	-	-	-	-	22	39	61	44	66	73	93
PHYSICS AND ASTRONOMY	1108	983	1015	1014	1043	1080	1080	1187	1237	1302	1278
Astronomy	58	52	50	52	50	42	43	52	46	66	49
Astrophysics	57	69	59	50	65	56	57	57	54	64	64
Acoustics	13	23	13	11	14	21	10	15	17	16	15
Atomic and Molecular	72	69	66	96	71	77	58	70	79	77	75
Electron	-	-	-	-	1	2	4	2	6	2	4
Electromagnetism	6	-	-	-	-	-	-	-	-	-	-
Elementary Particles	121	117	119	119	136	138	154	147	159	174	134
Fluids	14	15	14	13	15	11	16	6	21	17	14
Nuclear	103	73	63	53	90	72	86	89	74	88	81
Optics	46	43	54	42	50	53	51	58	50	65	78
Plasma	62	59	65	69	72	73	55	61	72	65	61
Polymer	-	-	-	-	10	8	11	11	15	20	7
Thermal	7	5	7	-	-	-	-	-	-	-	-
Solid State	243	201	253	235	222	258	248	280	287	252	297
Physics, General	194	165	164	167	150	170	176	222	238	271	271
Physics, Other	112	92	88	107	97	99	111	117	119	125	128
CHEMISTRY	1566	1538	1612	1680	1759	1765	1836	1903	1975	2016	1971
Analytical	207	185	229	190	264	228	285	257	314	301	289
Agricultural and Food	11	-	-	-	-	-	-	-	-	-	-
Inorganic	195	189	188	226	215	233	251	260	240	251	256
Nuclear	14	14	12	20	13	18	7	18	13	7	6
Organic	469	484	494	519	503	525	494	511	511	531	505
Pharmaceutical	43	52	52	55	78	56	60	58	65	73	65
Physical	326	282	275	324	311	329	304	293	302	318	309
Polymer	67	61	62	50	62	63	84	72	96	81	78
Theoretical	50	47	33	32	48	37	48	41	46	50	46
Chemistry, General	126	157	193	175	177	183	213	289	297	310	320
Chemistry, Other	58	67	74	89	88	93	90	104	91	94	97
EARTH, ATMOSPHERIC & MARINE SCI	646	628	583	657	637	614	617	589	628	728	738
Atmospheric Physics & Chemistry	16	19	15	17	21	11	16	21	24	19	15
Atmospheric Dynamics	26	20	27	22	16	25	21	16	17	25	15
Meteorology	-	-	-	-	17	28	23	27	17	35	27
Atmos & Meteorological Sci, General	-	-	-	-	16	5	10	7	16	14	14
Atmos & Meteorological Sci, Other	42	51	33	26	27	12	10	7	13	10	15
Geology	28	20	27	25	105	124	111	118	114	144	165
Geochemistry	57	51	48	51	48	43	48	37	31	46	39
Geophysics and Seismology	81	71	72	81	75	68	92	89	75	83	88
Paleontology	36	21	19	24	17	35	23	16	21	24	17
Fuel Technology, Petroleum	4	-	-	-	-	-	-	-	-	-	-
Mineralogy, Petrology	33	47	30	41	24	28	28	17	24	19	36
Stratigraphy, Sedimentation	34	40	42	47	25	16	23	14	22	30	24
Geomorphology & Glacial Geology	14	15	13	21	10	9	13	11	18	9	10
Applied Geology	19	27	21	25	8	7	8	4	5	7	5
Geological Sciences, General	37	48	45	38	15	10	11	12	18	8	19
Geological Sciences, Other	24	21	16	29	21	25	11	12	29	31	27
Environmental Sciences	53	40	54	53	50	45	42	35	29	58	68
Hydrology and Water Resources	20	27	21	24	20	18	17	16	18	24	24
Oceanography	91	85	70	92	87	78	68	78	73	81	86
Marine Sciences	31	25	30	41	22	21	24	22	38	28	26
Physical Sciences, Other	-	-	-	-	13	6	18	30	26	33	18

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix B.

	Year of Doctorate										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
ENGINEERING	2490	2479	2528	2646	2781	2913	3166	3376	3711	4189	4536
Aerospace, Aeronautic & Astronautic	81	81	97	86	106	119	124	118	142	150	177
Agricultural	66	68	64	48	58	74	60	52	74	70	102
Bioengineering & Biomedical	69	68	64	59	74	70	69	67	75	114	115
Ceramic	24	24	24	20	24	25	19	25	42	30	35
Chemical	287	285	296	306	349	361	440	476	527	625	624
Civil	236	240	287	308	354	351	358	387	441	489	498
Communications	-	-	-	-	25	11	30	23	26	24	25
Computer	78	62	71	72	83	56	55	77	62	100	117
Electrical, Electronics	533	478	478	544	517	593	631	706	691	885	993
Engineering Mechanics	85	91	78	103	68	91	89	94	113	105	109
Engineering Physics	17	18	22	12	10	8	12	13	13	9	16
Engineering Science	-	-	-	-	30	28	31	30	26	32	27
Environmental Health Engineering	66	66	71	60	43	57	33	42	36	43	42
Industrial	82	77	66	79	86	84	92	101	120	127	161
Materials Science	125	143	113	147	157	168	188	187	238	252	257
Mechanical	281	293	282	334	311	336	424	442	543	610	648
Metallurgical	87	106	97	88	87	78	96	93	112	92	87
Mining and Mineral	4	4	8	7	22	16	16	22	27	17	33
Naval Architecture, Marine Engineering	-	-	-	-	4	5	8	9	7	9	9
Nuclear	95	112	130	121	103	120	96	98	84	104	86
Ocean	-	-	-	-	12	11	25	14	24	21	20
Operations Research	67	63	80	58	44	50	54	54	51	44	67
Petroleum	24	31	21	27	22	17	24	18	23	33	29
Polymer	-	-	-	-	21	31	40	37	34	28	58
Systems	75	61	68	49	57	52	57	33	47	44	31
Engineering, General	32	42	36	29	30	29	26	55	54	49	64
Engineering, Other	76	66	75	89	84	72	69	103	79	83	106
LIFE SCIENCES	5223	5461	5611	5709	5553	5757	5779	5733	5748	6154	6343
BIOLOGICAL SCIENCES	3646	3803	3804	3893	3741	3880	3792	3807	3836	4108	4106
Biochemistry	603	673	645	649	647	606	581	576	573	612	670
Biophysics	133	108	99	91	88	90	69	72	86	97	87
Bacteriology	-	-	-	-	10	12	17	12	13	7	12
Plant Genetics	-	-	-	-	19	20	31	20	26	26	18
Plant Pathology	-	-	-	-	29	30	38	28	33	30	22
Plant Physiology	57	52	68	56	67	70	58	52	62	74	47
Botany, Other	141	144	147	146	116	126	120	121	106	112	117
Anatomy	151	147	156	163	107	103	135	86	92	88	79
Biometrics & Biostatistics	44	42	48	59	45	49	40	30	37	47	46
Cell Biology	39	44	47	41	118	123	100	130	127	118	132
Ecology	173	169	198	173	183	202	200	183	158	155	162
Hydrobiology	10	-	-	-	-	-	-	-	-	-	-
Embryology	14	18	20	10	13	15	15	9	6	7	10
Endocrinology	-	-	-	-	28	30	17	17	19	21	21
Entomology	162	161	143	170	141	156	173	170	123	133	138
Immunology	134	125	148	151	154	133	124	146	135	178	152
Molecular Biology	140	183	187	223	225	275	277	298	303	364	407
Microbiology & Bacteriology	349	365	355	324	-	-	-	-	-	-	-
Microbiology	-	-	-	-	309	346	289	326	301	333	340
Neurosciences	-	-	-	117	134	145	156	120	153	162	181
Nutritional Sciences	107	90	99	120	111	109	113	122	141	127	128
Parasitology	21	22	18	14	9	30	21	25	16	20	20
Toxicology	-	-	-	-	60	97	99	104	115	108	110
Human & Animal Genetics	-	-	-	-	95	82	105	91	113	118	112
Genetics	141	157	157	176	-	-	-	-	-	-	-
Human & Animal Pathology	85	108	106	97	97	88	110	91	127	112	103
Human & Animal Pharmacology	220	257	280	280	218	237	235	245	233	249	238
Human & Animal Physiology	314	340	327	309	246	237	244	240	246	225	271
Zoology, Other	249	226	198	199	192	158	147	155	139	167	133
Biological Sciences, General	187	209	204	196	174	190	190	213	229	258	236
Biological Sciences, Other	172	163	154	129	106	121	88	125	124	160	114
HEALTH SCIENCES	568	586	657	686	640	722	729	770	800	876	985
Audiology & Speech Pathology	139	123	140	129	113	104	99	82	107	93	90
Environmental Health	40	40	44	39	38	40	31	39	29	52	35
Public Health	-	1	4	3	54	53	103	103	96	122	126
Public Health & Epidemiology	121	127	157	159	-	-	-	-	-	-	-
Epidemiology	-	-	-	-	76	103	76	80	86	97	108
Nursing	53	77	89	112	126	161	183	216	218	247	314
Pharmacy	69	70	69	81	81	102	106	104	133	95	111
Veterinary Medicine	41	41	41	41	45	46	51	41	31	48	49
Health Sciences, General	19	15	24	16	20	14	13	27	12	23	23
Health Sciences, Other	86	92	89	106	87	99	67	78	88	99	129
AGRICULTURAL SCIENCES	1009	1072	1150	1130	1172	1155	1258	1156	1112	1170	1252
Agricultural Economics	154	160	168	179	157	158	147	158	136	155	164
Agricultural Business & Management	-	-	-	-	-	-	-	-	-	-	2
Animal Breeding & Genetics	-	-	-	-	25	28	28	25	23	27	23
Animal Husbandry	26	25	19	22	-	-	-	-	-	-	-
Animal Nutrition	112	119	149	133	56	71	78	65	82	54	66

APPENDIX TABLE B-1 (Continued)

	Year of Doctorate										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Dairy Sciences	-	-	-	-	-	-	-	-	-	12	16
Poultry Science	-	-	-	-	-	-	-	-	-	10	11
Animal Sciences, Other	-	-	-	-	92	90	95	91	76	86	95
Agronomy	138	151	177	159	149	137	158	159	143	141	140
Plant Breeding & Genetics	-	-	-	-	71	78	88	78	70	83	64
Plant Pathology	88	118	99	114	92	57	89	85	76	46	63
Plant Protection-Pest Management	-	-	-	-	-	-	-	-	-	1	7
Plant Sciences, Other	-	-	-	-	16	20	21	22	20	23	15
Food Sciences	107	102	104	110	141	113	136	121	131	16	1
Food Engineering	-	-	-	-	-	-	-	-	-	6	11
Food Sciences, Other	-	-	-	-	-	-	-	-	-	119	147
Soil Sciences	71	79	90	83	85	99	97	103	74	18	-
Soil Chemistry/Microbiology	-	-	-	-	-	-	-	-	-	33	28
Soil Sciences, Other	-	-	-	-	-	-	-	-	-	62	75
Horticulture Science	69	73	85	88	72	66	76	60	71	61	75
Fisheries Science	-	-	-	-	36	45	36	32	32	42	34
Fish and Wildlife	66	73	66	65	-	-	-	-	-	-	-
Wildlife Management	-	-	-	-	31	31	38	20	23	3	-
Wildlife/Range Management	-	-	-	-	-	-	-	-	-	36	52
Forestry Science	87	80	95	78	90	94	105	88	100	15	-
Forestry Biology	-	-	-	-	-	-	-	-	-	21	22
Forestry Engineering	-	-	-	-	-	-	-	-	-	3	1
Forestry Management	-	-	-	-	-	-	-	-	-	18	21
Wood Science	-	-	-	-	-	-	-	-	-	7	16
Renewable Natural Resources	-	-	-	-	-	-	-	-	-	7	12
Forestry & Related Sciences, Other	-	-	-	-	-	-	-	-	-	35	57
Agriculture, General	7	3	5	5	7	1	5	4	5	9	7
Agriculture, Other	84	89	93	94	52	67	61	45	50	21	27
SOCIAL SCIENCES (INCL PSYCH)	5961	5856	6142	5837	6096	5930	5765	5892	5789	5773	5955
Anthropology	383	370	369	333	373	335	353	381	352	325	324
Area Studies	24	22	20	19	20	23	19	28	17	16	17
Criminology	-	30	35	36	49	41	38	24	29	43	34
Demography	-	-	-	-	26	19	25	15	26	19	21
Economics	780	745	808	737	792	767	785	835	798	826	872
Econometrics	22	22	17	24	21	27	27	25	25	27	26
Geography	129	131	109	106	121	114	120	120	111	129	105
International Relations	81	80	87	77	76	95	78	76	82	77	92
Political Science & Government	522	505	445	459	397	419	406	414	404	392	432
Public Policy Studies	-	-	-	-	69	54	70	81	83	73	77
Sociology	632	601	605	568	525	515	461	491	423	449	435
Statistics	23	33	40	43	47	39	60	65	49	47	69
Urban Studies	91	79	94	93	74	81	75	50	72	87	60
Social Sciences, General	33	32	22	34	17	17	17	36	30	28	25
Social Sciences, Other	150	108	133	149	142	127	114	127	119	171	157
PSYCHOLOGY	3091	3098	3358	3159	3347	3257	3117	3124	3169	3064	3209
Clinical	1069	1106	1259	1168	1241	1195	1181	1172	1214	1092	1234
Cognitive	-	-	-	-	65	77	76	70	80	83	79
Comparative	21	8	11	12	11	13	11	14	9	7	8
Counseling	315	299	351	348	432	464	431	449	486	482	498
Developmental	221	207	201	192	219	207	175	184	200	176	148
Experimental	293	307	283	240	209	169	165	147	146	135	145
Educational	163	137	180	140	154	210	127	106	89	103	106
Industrial & Organizational	87	66	87	83	90	106	102	110	107	118	102
Personality	42	43	49	36	32	25	21	16	25	18	28
Physiological	102	108	102	90	94	73	79	73	69	85	62
Psychometrics	25	21	27	8	10	6	10	11	9	11	6
Quantitative	-	-	-	-	14	17	16	23	13	12	11
School	125	176	133	166	121	89	92	116	93	115	107
Social	216	190	180	179	191	157	167	141	133	140	126
Psychology, General	207	210	279	242	292	267	265	308	339	361	397
Psychology, Other	205	220	216	255	172	182	199	184	157	126	152
HUMANITIES	4141	3871	3751	3561	3500	3536	3429	3460	3500	3555	3558
History, American	302	285	228	271	224	240	176	197	197	209	206
History, European	218	196	166	158	168	150	143	121	121	127	107
History of Science	28	21	26	29	13	24	23	24	25	22	19
History, General	-	-	-	-	58	76	85	83	95	103	87
History, Other	281	243	272	234	153	127	116	138	148	142	116
Classics	56	54	62	60	44	57	44	51	55	56	51
Comparative Literature	144	107	132	118	124	133	133	101	121	139	103
Linguistics	156	182	176	191	164	160	176	189	199	166	188
Speech and Debate	53	63	38	38	48	41	38	30	37	37	35
Letters, General	-	-	-	-	3	14	13	19	25	16	13
Letters, Other	-	-	-	1	19	31	26	37	39	43	59
American Studies	84	81	87	64	99	76	87	68	75	70	76
Archeology	35	26	28	21	30	31	24	28	31	23	27
Art History & Criticism	166	144	158	138	150	141	137	126	143	134	145
Music	419	402	368	402	391	445	447	476	499	505	528
Philosophy	278	255	277	251	241	215	238	247	233	222	271
Religion	198	173	165	151	177	183	181	182	182	216	215
Theatre	97	94	103	94	108	101	92	88	82	92	79
LANGUAGE AND LITERATURE	1555	1487	1396	1260	1219	1225	1164	1164	1112	1147	1151
American	206	209	145	154	173	190	204	215	190	186	193
English	-	1	-	1	498	501	483	462	440	482	488
English	703	742	675	615	44	42	42	42	38	49	40
French	187	162	167	119	121	108	86	102	103	101	105
German	116	99	88	74	77	80	62	79	77	76	73

NOTE: Field groupings may differ from those in reports published by federal sponsors of the Survey of Earned Doctorates. See inside the back cover for a description of fields as reported in this table. Refer also to the explanatory note about this table in front of Appendix B.

	Year of Doctorate										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Italian	20	10	16	17	22	17	14	15	21	14	20
Spanish	181	145	184	177	161	144	145	122	133	137	133
Russian	42	32	28	24	24	33	28	28	19	13	13
Slavic	-	-	-	-	9	12	10	8	5	5	7
Chinese	-	-	-	-	16	13	14	13	13	12	9
Japanese	-	-	-	-	5	12	13	9	9	6	13
Hebrew	-	-	-	-	11	13	9	11	13	12	11
Arabic	-	-	-	-	8	8	5	9	8	14	6
Other Languages	100	87	93	79	50	52	49	49	43	40	40
Humanities, General	19	12	23	28	17	22	27	23	23	25	20
Humanities, Other	52	46	46	52	50	44	59	68	58	61	62
EDUCATION	7385	7586	7497	7251	7174	6808	6733	6645	6449	6357	6265
Curriculum and Instruction	874	838	815	811	861	869	825	794	762	815	836
Educational Admin & Supervision	1500	1536	1659	1474	1632	1569	1625	1636	1686	1747	1620
Educational Media	92	75	77	76	88	83	101	79	68	67	75
Educational Measures & Statistics	104	89	90	94	-	-	-	-	-	-	-
Educational Statistics & Research	-	-	-	-	86	105	74	58	73	51	58
Educational Test, Eval, Meas	-	-	-	-	51	56	44	47	37	55	42
Educational Psychology	415	476	445	454	274	233	388	330	320	323	298
School Psychology	-	-	-	-	88	110	102	92	95	98	85
Social Foundations	242	214	209	214	142	151	135	124	114	122	112
Special Education	316	346	312	347	349	312	270	273	248	258	256
Student Counseling, Personnel Serv	607	594	549	540	506	391	397	315	315	324	268
Higher Education	683	685	671	653	635	657	589	612	570	399	369
Pre-elementary Education	-	74	90	78	63	54	65	86	73	83	63
Elementary Education	169	162	180	149	111	97	122	94	105	93	100
Junior High Education	-	-	-	-	1	-	1	1	1	1	-
Secondary Education	154	168	136	104	87	62	68	86	65	67	53
Adult & Continuing Education	169	235	233	257	221	218	207	223	203	229	236
TEACHING FIELDS	1411	1471	1437	1333	1327	1170	1118	1142	1064	987	971
Agricultural Education	24	39	43	35	47	47	40	39	39	32	35
Art Education	50	45	63	55	58	41	43	43	52	42	39
Business Education	66	52	50	44	62	52	52	50	36	44	40
English Education	80	76	64	67	76	72	68	79	72	57	51
Foreign Languages Education	35	36	29	31	25	25	30	37	37	53	34
Physical Educ, Health & Recreation	346	365	368	351	-	-	-	-	-	-	-
Health Education	-	-	-	-	99	93	89	81	91	86	101
Home Economics Education	29	27	25	33	25	26	21	17	17	17	19
Industrial Arts Education	29	27	27	39	19	27	13	20	24	11	17
Mathematics Education	85	74	62	50	62	64	65	72	74	56	68
Music Education	88	110	76	103	112	92	81	94	109	76	98
Nursing Education	-	41	23	25	17	21	21	40	36	34	29
Physical Education	-	-	-	-	235	219	220	210	192	183	177
Reading Education	151	160	193	153	169	142	113	134	94	74	95
Science Education	93	96	107	86	78	77	88	65	63	67	48
Social Science Education	65	52	49	29	39	22	24	22	17	23	13
Speech Education	16	10	12	12	2	10	7	5	5	5	1
Technical Education	-	-	-	-	-	-	-	-	-	13	28
Trade & Industrial Education	201	229	213	191	138	117	82	86	68	67	47
Other Teaching Fields	53	32	33	29	64	23	61	48	38	47	31
Education, General	410	427	405	419	349	311	294	354	366	358	428
Education, Other	239	196	189	248	303	360	308	299	284	280	395
PROFESSIONAL/OTHER FIELDS	1740	1656	1658	1816	1752	1941	1894	1982	2129	2142	2202
BUSINESS AND MANAGEMENT	715	640	624	685	750	869	790	902	982	1033	1071
Accounting	-	-	-	-	163	164	150	157	161	175	184
Banking and Finance	-	-	-	-	94	123	104	126	156	148	152
Business Admin & Management	-	-	-	-	179	175	174	222	225	265	246
Business Economics	-	-	-	-	25	30	20	28	26	27	27
Marketing Management & Research	-	-	-	-	73	126	94	110	113	126	132
Business Statistics	-	-	-	-	8	7	9	3	8	6	15
Operations Research	-	-	-	-	38	46	45	46	64	50	52
Organizational Behavior	-	-	-	-	53	70	68	57	66	74	94
Business & Management, General	-	-	-	-	35	49	49	56	75	78	61
Business & Management, Other	715	640	624	685	82	79	77	97	88	[illegible]	108
COMMUNICATIONS	285	270	240	266	250	255	266	258	309	24[illegible]	304
Communications Research	-	-	-	-	51	66	55	79	90	72	83
Journalism	17	17	18	18	20	17	22	18	7	21	15
Radio and Television	-	-	-	-	27	20	19	13	16	12	29
Communications, General	-	-	-	-	60	68	89	75	102	70	79
Communications, Other	268	253	222	248	92	84	81	73	94	72	98
OTHER PROFESSIONAL FIELDS	717	724	759	841	770	802	813	796	776	812	772
Architecture, Environmental Design	-	-	-	-	34	25	36	27	33	31	43
Home Economics	88	90	85	98	79	107	90	88	67	58	55
Law	24	21	28	21	19	24	25	31	27	33	26
Library & Archival Science	66	66	62	83	51	68	72	57	48	57	63
Public Administration	164	145	147	173	113	127	112	88	78	92	96
Social Work	154	179	213	218	190	231	220	235	214	241	209
Theology	193	195	201	214	227	212	240	240	254	251	232
Professional Fields, General	-	-	-	-	-	2	-	-	1	2	-
Professional Fields, Other	28	28	23	34	17	6	18	30	54	47	48
OTHER FIELDS	23	22	35	24	22	15	25	26	62	50	55

SOURCE: National Research Council, Survey of Earned Doctorates.

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APPENDIX TABLE B-2 Number of Doctorate Recipients, by Gender, Race/Ethnicity, and Citizenship, 1979-1989

Total All Doctorates

	Year of Doctorate										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
TOTAL MEN AND WOMEN	31239	31020	31357	31111	31282	31337	31297	31895	32356	33480	34319
U.S. Citizens	25464	25221	25061	24391	24359	24027	23368	23080	22979	23273	23172
Permanent Visas	1320	1291	1281	1228	1275	1224	1324	1432	1578	1618	1605
Temporary Visas	3587	3644	3940	4204	4499	4832	5229	5276	5610	6192	6590
Unknown Citizenship	868	864	1075	1288	1149	1254	1376	2107	2189	2397	2952
Total Known Race/Ethnicity	28713	28767	29144	29087	29389	29282	29057	28921	29213	30325	30625
U.S. Citizens	23947	23970	24007	23791	23734	23425	22846	22650	22501	22886	22785
Permanent Visas	1285	1259	1257	1190	1249	1194	1291	1357	1509	1541	1543
Temporary Visas	3397	3462	3757	3954	4250	4509	4849	4837	5141	5836	6230
Unknown Citizenship	84	76	123	152	156	154	71	77	62	62	67
American Indians	84	75	85	77	82	74	96	100	116	94	93
U.S. Citizens	81	75	85	77	81	74	96	99	115	94	93
Permanent Visas*	-	-	-	-	1	-	-	-	-	-	-
Temporary Visas*	3	-	-	-	-	-	-	1	1	-	-
Unknown Citizenship											
Asians	2602	2621	2711	2904	3124	3394	3642	3727	4126	4780	5150
U.S. Citizens	428	458	465	452	492	512	516	530	542	613	624
Permanent Visas	674	644	608	552	551	507	553	528	625	623	631
Temporary Visas	1463	1472	1564	1829	2006	2295	2526	2645	2933	3517	3877
Unknown Citizenship	37	47	74	71	75	80	47	24	26	27	18
Blacks	1445	1445	1491	1526	1382	1494	1440	1269	1217	1255	1229
U.S. Citizens	1056	1032	1013	1047	922	953	912	822	767	813	811
Permanent Visas	58	74	97	96	83	102	131	126	139	146	135
Temporary Visas	320	331	372	373	363	419	395	313	305	290	272
Unknown Citizenship	11	8	9	10	14	20	2	8	6	6	11
Hispanics	900	821	931	920	969	918	1001	1055	1055	1049	1041
U.S. Citizens	462	412	464	535	539	536	561	571	618	596	569
Permanent Visas	77	73	62	79	69	71	73	107	91	99	111
Temporary Visas	348	328	389	294	342	300	361	372	338	348	356
Unknown Citizenship	13	8	16	12	19	11	6	5	8	6	5
Whites	23682	23805	23926	23660	23832	23402	22878	22770	22699	23147	23112
U.S. Citizens	21920	21993	21980	21680	21700	21350	20761	20628	20459	20770	20688
Permanent Visas	476	468	490	463	545	514	534	596	654	673	666
Temporary Visas	1263	1331	1432	1458	1539	1495	1567	1506	1564	1681	1725
Unknown Citizenship	23	13	24	59	48	43	16	40	22	23	33
Unknown Race/Ethnicity	2526	2253	2213	2024	1893	2055	2240	2974	3143	3155	3694
U.S. Citizens	1517	1251	1054	600	625	602	522	430	478	387	387
Permanent Visas	35	32	24	38	26	30	33	75	69	77	62
Temporary Visas	190	182	183	250	249	323	380	439	469	356	360
Unknown Citizenship	784	788	952	1136	993	1100	1305	2030	2127	2335	2885

NOTE: The reader is referred to the explanatory note about this table in front of Appendix B.

*In most cases, non-U.S. American Indians are citizens of Canada or of Latin American countries.

Doctorates: MEN

	Year of Doctorate										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
TOTAL MEN	22302	21613	21465	21018	20749	20638	20552	20591	20931	21668	21809
U.S. Citizens	17580	16875	16360	15562	15120	14730	14221	13635	13572	13714	13289
Permanent Visas	1014	972	973	915	953	892	999	1067	1117	1162	1126
Temporary Visas	3092	3154	3387	3621	3872	4134	4395	4414	4722	5132	5399
Unknown Citizenship	616	612	745	920	804	882	937	1475	1520	1660	1995
Total Known Race/Ethnicity	20453	19971	19895	19538	19370	19132	18942	18430	18670	19393	19227
U.S. Citizens	16487	15962	15604	15142	14673	14304	13856	13336	13245	13436	13007
Permanent Visas	987	950	957	886	931	867	971	1004	1064	1095	1080
Temporary Visas	2922	2997	3226	3396	3645	3844	4057	4037	4313	4819	5091
Unknown Citizenship	57	62	108	114	121	117	58	53	48	43	49
American Indians	59	46	[illegible]	44	51	54	40	59	63	52	48
U.S. Citizens	56	46	36	44	50	54	40	58	62	52	48
Permanent Visas*	-	-	-	-	1	-	-	-	-	-	-
Temporary Visas*	3	-	-	-	-	-	-	1	1	-	-
Unknown Citizenship											
Asians	2158	2151	2223	2355	2542	2780	2945	3040	3349	3845	4129
U.S. Citizens	311	313	315	281	312	338	329	347	369	413	440
Permanent Visas	564	513	499	444	431	389	437	417	455	458	457
Temporary Visas	1253	1282	1341	1567	1731	1982	2137	2258	2505	2956	3219
Unknown Citizenship	30	43	68	63	68	71	42	18	20	18	13
Blacks	898	871	924	911	833	903	851	706	701	691	673
U.S. Citizens	551	499	499	483	413	427	379	322	317	315	323
Permanent Visas	52	63	80	81	73	81	117	106	118	121	119
Temporary Visas	288	305	339	340	339	382	354	275	261	250	221
Unknown Citizenship	7	4	6	7	8	13	1	3	5	5	10
Hispanics	678	592	657	650	635	621	646	665	677	680	656
U.S. Citizens	308	256	275	344	288	314	300	302	332	322	306
Permanent Visas	52	48	47	52	45	47	50	71	50	65	68
Temporary Visas	310	280	321	247	288	252	294	289	288	288	279
Unknown Citizenship	8	8	14	7	14	8	2	3	7	5	3
Whites	16660	16311	16035	15578	15309	14774	14460	13960	13880	14125	13721
U.S. Citizens	15261	14848	14459	13990	13610	13171	12808	12307	12165	12334	11890
Permanent Visas	319	326	331	309	381	350	367	410	441	451	436
Temporary Visas	1068	1130	1225	1242	1287	1228	1272	1214	1258	1325	1372
Unknown Citizenship	12	7	20	37	31	25	13	29	16	15	23
Unknown Race/Ethnicity	1849	1642	1570	1480	1379	1506	1610	2161	2261	2275	2582
U.S. Citizens	1093	913	756	420	447	426	365	299	327	278	282
Permanent Visas	27	22	16	29	22	25	28	63	53	67	46
Temporary Visas	170	157	161	225	227	290	338	377	409	313	308
Unknown Citizenship	559	550	637	806	683	765	879	1422	1472	1617	1946

APPENDIX TABLE B-2 (Continued)

Doctorates: WOMEN

	Year of Doctorate										
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
TOTAL WOMEN	8937	9407	9892	10093	10533	10699	10745	11304	11425	11812	12510
U.S. Citizens	7884	8346	8701	8829	9239	9297	9147	9445	9407	9559	9883
Permanent Visas	306	319	308	313	322	332	325	365	461	456	479
Temporary Visas	495	490	553	583	627	698	834	862	888	1060	1191
Unknown Citizenship	252	252	330	368	345	372	439	632	669	737	957
Total Known Race/Ethnicity	8260	8796	9249	9549	10019	10150	10115	10491	10543	10932	11398
U.S. Citizens	7460	8008	8403	8649	9061	9121	8990	9314	9256	9450	9778
Permanent Visas	298	309	300	304	318	327	320	353	445	446	463
Temporary Visas	475	465	531	558	605	665	792	800	828	1017	1139
Unknown Citizenship	27	14	15	38	35	37	13	24	14	19	18
American Indians	25	29	29	33	31	20	56	41	53	42	45
U.S. Citizens	25	29	29	33	31	20	56	41	53	42	45
Permanent Visas*	-	-	-	-	-	-	-	-	-	-	-
Temporary Visas*	-	-	-	-	-	-	-	-	-	-	-
Unknown Citizenship	-	-	-	-	-	-	-	-	-	-	-
Asians	444	470	488	549	582	614	697	687	777	935	1021
U.S. Citizens	117	145	150	171	180	174	187	183	173	200	184
Permanent Visas	110	131	109	108	120	118	116	111	170	165	174
Temporary Visas	210	190	223	262	275	313	389	387	428	561	658
Unknown Citizenship	7	4	6	8	7	9	5	6	6	9	5
Blacks	547	574	567	615	549	591	589	563	516	564	556
U.S. Citizens	505	533	514	564	509	526	533	500	450	498	488
Permanent Visas	6	11	17	15	10	21	14	20	21	25	16
Temporary Visas	32	26	33	33	24	37	41	38	44	40	51
Unknown Citizenship	4	4	3	3	6	7	1	5	1	1	1
Hispanics	222	229	274	270	334	297	355	390	378	369	385
U.S. Citizens	154	156	189	191	251	222	261	269	286	274	263
Permanent Visas	25	25	15	27	24	24	23	36	41	34	43
Temporary Visas	38	48	68	47	54	48	67	83	50	60	77
Unknown Citizenship	5		2	5	5	3	4	2	1	1	2
Whites	7022	7494	7891	8082	8523	8628	8418	8810	8819	9022	9391
U.S. Citizens	6659	7145	7521	7690	8090	8179	7953	8321	8294	8436	8798
Permanent Visas	157	142	159	154	164	164	167	186	213	222	230
Temporary Visas	195	201	207	216	252	267	295	292	306	356	353
Unknown Citizenship	11	6	4	22	17	18	3	11	6	8	10
Unknown Race/Ethnicity	677	611	643	544	514	549	630	813	882	880	1112
U.S. Citizens	424	338	298	180	178	176	157	131	151	109	105
Permanent Visas	8	10	8	9	4	5	5	12	16	10	16
Temporary Visas	20	25	22	25	22	33	42	62	60	43	52
Unknown Citizenship	225	238	315	330	310	335	426	608	655	718	939

NOTE: The reader is referred to the explanatory note about this table in front of Appendix B.

*In most cases, non-U.S. American Indians are citizens of Canada or of Latin American countries.

SOURCE: National Research Council, Survey of Earned Doctorates.

APPENDIX Table B-3 Countries of Origin of Non-U.S. Citizen Doctorate Recipients, 1960-1989

Country	Year of Doctorate						
	1960-1989	1960-1964	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989
Canada	10463	965	1833	2703	1816	1536	1610
Mexico/Central America, Total	2375	90	216	289	423	593	764
Belize	9	-	-	-	2	5	2
Costa Rica	221	15	18	25	44	48	71
El Salvador	61	2	4	8	17	12	18
Guatemala	93	5	12	12	22	18	24
Honduras	59	-	6	6	10	13	24
Mexico	1722	58	138	199	299	443	585
Nicaragua	64	2	11	8	6	20	17
Panama	145	8	27	31	23	33	23
Mexico/Central America, Unknown	1	-	-	-	-	1	-
Cuba & Islands, Total	1139	25	158	228	232	242	254
Bahamas	27	-	-	1	12	6	8
Barbados	41	-	-	9	12	14	6
Bermuda	17	-	1	4	3	3	6
Cuba	202	7	58	81	32	13	11
Dominican Republic	77	-	1	8	13	24	31
Haiti	68	1	4	15	17	13	18
Jamaica	286	-	-	30	70	91	95
Martinique	1	-	-	-	-	-	1
Netherlands Antilles	13	-	-	-	2	3	8
Trinidad & Tobago	174	-	-	14	53	54	53
Cuba & Islands, Unknown	233	17	94	66	18	21	17
South America, Total	7025	155	499	1214	1576	1752	1829
Argentina	926	28	95	249	156	179	219
Bolivia	102	2	8	19	26	21	26
Brazil	2377	34	120	283	585	736	619
Chile	1002	33	89	183	236	203	258
Colombia	802	21	64	188	189	157	183
Ecuador	129	5	14	24	30	30	26
Guyana	164	1	8	33	39	37	46
Paraguay	32	-	4	8	5	7	8
Peru	435	10	34	103	100	89	99
Surinam	3	-	-	-	-	-	3
Uruguay	123	7	8	16	21	26	45
Venezuela	928	14	54	108	189	267	296
South America, Unknown	2	-	1	-	-	-	1
Northern Europe, Total	6290	418	829	1536	1171	1078	1258
Denmark	239	14	22	52	54	51	46
England	4311	309	639	1092	801	701	769
Finland	219	7	19	39	33	62	59
Iceland	137	8	9	12	17	27	64
Ireland*	631	32	58	144	110	114	173
Norway	437	33	53	137	94	61	59
Scotland	40	3	7	6	5	6	13
Sweden	264	12	22	52	53	51	74
Wales	12	-	-	2	4	5	1
Central Europe, Total	3007	150	353	670	468	478	888
Austria	218	16	34	61	37	35	35
West Germany†	1945	104	248	471	311	286	525
Italy	829	30	71	135	117	152	324
Liechtenstein	1	-	-	-	-	-	1
Malta	13	-	-	2	3	5	3
Central Europe, Unknown	1	-	-	1	-	-	-
Eastern Europe, Total	2866	161	268	462	524	539	912
Albania	1	1	-	-	-	-	-
Bulgaria	10	-	1	-	3	-	6
Czechoslovakia	64	2	5	34	15	3	5
Greece	1906	100	199	298	340	377	592
Hungary	75	26	4	12	5	2	26
Poland	307	14	21	27	29	79	137
Romania	62	3	-	10	29	12	8
U.S.S.R.	21	1	2	1	5	5	6
Yugoslavia	410	9	32	79	98	60	132
Eastern Europe, Unknown	10	5	4	1	-	-	-

NOTE: Because response rates to the country of citizenship question have varied over time, the numbers shown in this table may sometimes be lower than if response rates had been more stable. The reader is referred to the totals at the end of the table and to the explanatory note about this table in front of Appendix B.

*Because of coding inconsistencies through the years, it is not always possible to determine whether a recipient was from the Republic of Ireland or Northern Ireland.
†Includes "Germany, Unspecified." The German Democratic Republic (East Germany) did allow exchange students in the United States for partial preparation toward the Ph.D., but the degree was subsequently awarded by the home country institution. Virtually all German recipients of U.S. Ph.D.s have been West German.

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APPENDIX TABLE B-3 (Continued)

Country	Year of Doctorate						
	1960-1989	1960-1964	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989
Western Europe, Total	4159	164	416	919	803	806	1051
Belgium	582	23	71	157	100	99	132
France	1411	41	124	363	303	268	312
Luxembourg	19	2	1	2	2	5	7
The Netherlands	669	42	82	135	120	114	176
Portugal	283	9	12	33	44	68	117
Spain	752	25	77	128	146	163	213
Switzerland	442	21	49	101	88	89	94
Western Europe, Unknown	1	1	-	-	-	-	-
Eastern Asia, Total	33465	1134	2977	5499	5524	6410	11921
Burma	66	11	26	14	3	2	10
People's Republic of China	1870	-	-	-	-	86	1784
Taiwan§	15385	556	1804	3184	2536	2935	4370
China, Unspecified	44	-	-	-	-	10	34
Hong Kong	1933	4	67	260	532	550	520
Japan	2867	225	342	584	512	553	651
Khmer Republic	13	-	2	6	4	1	-
Korea, Republic of#	6937	222	511	866	889	1168	3281
Laos	2	-	-	1	-	-	1
Macao	5	-	-	1	1	1	2
Malaysia	1001	8	37	117	213	273	353
Outer Mongolia	1	-	-	-	-	-	1
Singapore	228	1	13	51	26	38	99
Thailand (Siam)	2828	81	133	331	729	754	800
Vietnam, Democratic Republic	4	1	2	1	-	-	-
Vietnam, Republic of	144	23	40	62	14	2	3
Vietnam, Unspecified	133	-	-	19	65	37	12
Eastern Asia, Unknown	4	2	-	2	-	-	-
Western Asia, Total	31038	1801	3656	5892	5359	6596	7734
Afghanistan	132	3	14	23	58	23	11
Bahrain	22	-	-	-	3	2	17
Bangladesh	529	-	-	25	88	161	255
Cyprus	191	2	17	38	43	34	57
India	14238	1122	2104	3252	2467	2248	3045
Iran	4331	90	218	502	773	1557	1191
Iraq	990	88	168	191	107	207	229
Israel	2825	159	378	607	606	604	471
Jordan	1075	44	67	139	141	292	392
Kuwait	230	-	-	17	39	71	103
Lebanon	800	46	105	138	139	141	231
Maldive Islands	1	-	-	-	-	-	1
Nepal	165	6	7	26	24	41	61
Oman	5	-	-	-	1	2	2
Pakistan	1569	132	339	347	200	222	329
Palestine	66	10	1	5	6	21	23
Qatar	12	-	-	-	-	4	8
Saudi Arabia	1047	-	-	40	118	417	472
Sikkim	1	-	-	1	-	-	-
Sri Lanka	558	20	29	48	71	132	258
Syria	272	20	53	61	36	29	73
Turkey	1870	57	143	387	435	377	471
United Arab Republic	65	2	12	38	-	2	11
Yemen Arab Republic	23	-	-	-	1	4	18
Yemen People's Republic	6	-	-	-	1	4	1
Yemen, Unspecified	7	-	-	-	2	1	4
Western Asia, Unknown	8	-	1	7	-	-	-
Pacific, Total	5631	411	784	1233	972	1109	1122
Australia	2103	138	260	485	396	456	368
Brunei	1	-	-	-	-	-	1
Fiji	10	-	1	2	2	1	4
French Australs	1	-	-	-	-	1	-
French Polynesia	1	-	-	-	-	-	1
Indonesia	955	44	95	122	137	236	321
Nauru	1	-	-	-	-	1	-
New Zealand	711	49	108	164	139	126	125
The Philippines	1833	180	320	457	296	284	296
Tonga	4	-	-	-	2	1	1
Western Samoa	6	-	-	2	-	1	3
Pacific, Unknown	5	-	-	1	-	2	2

NOTE: Because response rates to the country of citizenship question have varied over time, the numbers shown in this table may sometimes be lower than if response rates had been more stable. The reader is referred to the totals at the end of the table and to the explanatory note about this table in front of Appendix B.

§Includes "China, Unspecified" until 1980. The People's Republic of China did not permit its citizens to study nonlanguage fields in the United States until after the signing of the Understanding on Educational Exchanges in the fall of 1978.
#Includes "Korea, Unspecified." The Democratic People's Republic of Korea (North Korea) does not permit its citizens to study in the United States.

Country	Year of Doctorate						
	1960-1989	1960-1964	1965-1969	1970-1974	1975-1979	1980-1984	1985-1989
West North Africa, Total	4340	4	18	275	956	1488	1599
Algeria	309	1	6	11	18	78	195
Benin (Dahomey)	1	-	-	-	-	-	1
Burkina Faso	12	-	-	-	-	7	5
Cameroon	177	-	-	11	33	62	71
Equatorial Guinea	1	-	-	-	1	-	-
The Gambia	16	-	-	1	7	3	5
Ghana	550	-	-	44	124	177	205
Guinea	2	-	-	-	-	-	2
Ivory Coast	63	-	-	2	9	25	27
Liberia	104	2	6	12	30	23	31
Mali	23	-	-	1	-	10	12
Mauritania	3	-	-	-	1	1	1
Morocco	140	-	-	1	16	24	99
Niger	7	-	-	-	1	2	4
Nigeria	2635	-	-	163	651	997	824
Senegal	12	-	-	-	-	4	8
Sierra Leone	118	-	-	6	40	44	28
Togo	20	-	-	-	2	7	11
Tunisia	146	1	6	23	23	24	69
West North Africa, Unknown	1	-	-	-	-	-	1
East North Africa, Total	4376	255	652	650	569	1137	1113
Arab Republic of Egypt	2930	234	612	512	286	618	668
Central African Republic	2	-	-	-	1	1	-
Chad	9	-	-	-	-	2	7
Ethiopia	392	9	20	65	93	110	95
Djibouti	3	-	-	-	-	1	2
Libyan Arab Republic	524	2	6	16	103	231	166
Somali Democratic Republic	21	-	-	1	3	3	14
The Sudan	494	10	14	56	83	170	161
East North Africa, Unknown	1	-	-	-	-	1	-
South Africa, Total	1595	-	-	145	380	500	570
Angola	1	-	-	-	-	-	1
Botswana	14	-	-	-	1	2	11
Burundi	5	-	-	-	-	2	3
Congo	2	-	-	-	-	-	2
Kenya	310	-	-	26	69	98	117
Lesotho	13	-	-	-	5	6	2
Madagascar (Malagasy Republic)	28	-	-	4	1	17	6
Malawi	59	-	-	2	14	21	22
Mauritius	17	-	-	-	5	5	7
Mozambique	2	-	-	-	1	-	1
Rwanda	10	-	-	-	1	5	4
Seychelles	1	-	-	-	-	-	1
South Africa Republic	451	-	-	57	94	140	160
South West Africa	9	-	-	-	2	-	7
Swaziland	19	-	-	1	2	5	11
Tanzania	178	-	-	12	45	52	69
Uganda	144	-	-	19	57	32	36
Zaire	111	-	-	15	36	31	29
Zambia	99	-	-	3	13	40	43
Zimbabwe	120	-	-	6	34	43	37
South Africa, Unknown	2	-	-	-	-	1	1
Africa, Unknown	947	92	322	532	-	1	-
Africa, Total	11258	351	992	1602	1905	3126	3282
Total with Known Country	118716	5825	12981	22247	20773	24265	32625
Total with Unknown Country	16143	1711	1683	1779	3988	3153	3829
Total Non-U.S. Citizens	134859	7536	14664	24026	24761	27418	36454

SOURCE: National Research Council, Survey of Earned Doctorates.

APPENDIX C: Technical Notes

All tables and figures in this report, except for those in Appendix A, display percentages based only on the number of doctorate recipients who responded to the applicable survey questions; those who did not respond are excluded.[1] The technical notes in this section, for the most part, provide the rates of nonresponse to questions covered in the report. Presented first is a table showing the overall nonresponse rates to the various data items in 1989. Following this table is a series of notes related to specific tables and figures that appear in the body of the report. These notes are grouped by the major focus of the data: citizenship, cumulative debt, postgraduation plans, primary source of support, race/ethnicity, and time-to-degree. They provide nonresponse rates for selected populations and years, as well as additional descriptive explanation of the data as needed.

In 1989, 91.4 percent of new recipients completed the survey forms themselves. Skeletal information on the remaining 8.6 percent of recipients was obtained from doctorate-granting institutions or commencement programs. The following data items are available for all recipients, whether or not they completed the questionnaires themselves: gender, Ph.D. institution, Ph.D. field, and Ph.D. year. Because nonresponse rates computed by gender or Ph.D. field reflect the entire doctoral cohort, they may be significantly higher than nonresponse rates for other populations (e.g., U.S. citizens, Asians). Populations defined by data items such as citizenship or race/ethnicity are most likely to be comprised of self-reporting recipients, in which case the data are more complete and nonresponse rates are lower than for the overall cohort. For example, in 1989, information on educational debt was not available for 10.2 percent of male Ph.D.s and 9.2 percent of female Ph.D.s., or 9.9 percent overall. Because gender is available for all Ph.D.s, these rates include the 8.6 percent of recipients who were not self-reporting in 1989. In comparison, the nonresponse rate to the debt question was 1.3 percent among U.S. citizens, 1.6 percent among permanent residents, and 2.3 percent among temporary residents. Rates are lower when computed by citizenship than by gender because the base number represents a reduced population that was more likely to have been self-reporting.

In most cases, nonresponse rates for 1989 are higher than those for earlier years. Although it is not possible to determine the exact number of self-reported questionnaires prior to 1980, approximate nonresponse rates can be derived from data items that are unlikely to be obtained from institutions or commencement programs. Looking at high school location, one finds that 11.2 percent of new Ph.D.s in 1989 did not respond to this item, compared to only 2.0 percent in 1960, 3.8 percent in 1973, and 4.7 percent in 1979. The 1989 rate includes the 8.6 percent of Ph.D.s who did not complete the survey forms themselves, as well as the 2.6 percent who were self-reporting but neglected to answer the question.

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[1] Appendix Tables A-3 and A-4 report categories for "unknown" responses, as well, so percentages are based on the total doctoral cohort.

ITEM NONRESPONSE RATES: 1989

Data Item	Nonresponse Rate (%)
Baccalaureate field	10.9
Baccalaureate institution	7.0*
Baccalaureate year (for time-to-Ph.D.)	9.0
Birth year (for age)	9.2
Citizenship	8.6
Country of citizenship	10.4 (of non-U.S. citizens)
Cumulative debt (yes or no)	10.0
Cumulative debt level	0.7 (of Ph.D.s with debt)
Dependents	15.1
Doctorate field	0.0
Doctorate institution	0.0
Doctorate year	0.0
Gender	0.0
Marital status	9.9
Master's institution	23.2
Postdoctoral employer type	3.9 (of employed Ph.D.s)
Postdoctoral location	32.5
Postdoctoral plans (employment vs. study)	11.4
Postdoctoral status (definite vs. seek)	10.2
Postdoctoral work activity (primary)	7.6 (of employed Ph.D.s)
Predoctoral status	10.2
Race/ethnicity	9.9
Sources of graduate school support	10.6
Years not enrolled from: (for time-to-Ph.D.)	
baccalaureate to graduate entrance	13.6
graduate entrance to doctorate	17.0

NOTE: In 1989, 91.4 percent of new doctorate recipients completed the survey form. The item nonresponse rates in this table include the 8.6 percent of recipients who were not self-reporting. Basic information for the missing group was obtained from the doctorate-granting institutions or commencement programs. Field, institution, and year of doctorate, as well as gender, are available for all recipients.

* The nonresponse rate to this item is less than the overall nonresponse rate of 8.6 percent because baccalaureate institution is sometimes available from commencement programs.

CITIZENSHIP

1. Figure 4 (page 9), Figure 8 (page 32), and Table 14 (page 33): The overall rates of nonresponse to the citizenship status question were 0.9 percent in 1960, 2.0 percent in 1973, and 8.6 percent in 1989.

2. Table 3 (page 10), Figure 9 (page 39), and Table 17 (page 40): See technical note 1 for the overall rate of nonresponse to the citizenship status question. By broad field in 1989, the nonresponse rates to citizenship status were 8.0 percent in physical sciences, 8.8 percent in engineering, 6.9 percent in life sciences, 12.2 percent in social sciences, 8.1 percent in humanities, 7.4 percent in education, and 9.0 percent in professional/other fields. In 1960, the nonresponse rates ranged from 0.5 percent in engineering and education to 1.7 percent in humanities and professional/other fields. In 1973, professional/other fields exhibited the highest rate of nonresponse at 6.1 percent, while the other six fields showed rates between 1.3 percent (engineering) and 2.1 percent (humanities).

3. Table 15 (page 35), Table 16 (page 36), Table 18 (page 42): Response rates to the country of citizenship question have varied significantly through the years. Therefore, some of the numbers presented in these tables may be lower than if response rates had been more stable. Because more than one-third of non-U.S. citizen Ph.D.s in 1960 did not respond to the country of citizenship question, 1964 is the earliest year shown in these tables. In 1964, the rate of nonresponse to country of citizenship was 13.1 percent; in 1973, it was 11.1 percent; and in 1989, it was 10.4 percent. See the explanatory note for Appendix Table B-3 (page 88) for pertinent information about the coding of countries over time and the impact of revisions to immigration and naturalization legislation on the origins of non-U.S. Ph.D.s. For Table 18, also see technical note 2, which provides nonresponse rates to the citizenship status question by broad field.

CUMULATIVE DEBT

4. Table 12 (page 28): In 1989, 9.9 percent of all Ph.D.s did not respond to the question on cumulative debt related to education. By demographic group, the nonresponse rates were 10.2 percent for men; 9.2 percent for women; 1.3 percent for U.S. citizens; 1.6 percent for permanent residents; 2.3 percent for temporary residents. Among U.S. racial/ethnic groups, the rates of nonresponse were 3.2 percent for American Indians; 0.6 percent for Asians; 1.9 percent for blacks; 1.6 percent for Hispanics; and 1.1 percent for whites. Of those Ph.D.s who reported having debt, only 0.7 percent did not indicate the level of debt.

5. Table 13 (page 29): See technical note 4 for the overall nonresponse rate to the debt question in 1989. By predoctoral status, the rates of nonresponse were 0.7 percent for full-time employed and part-time employed; 0.6 percent for fellowship; 0.5 percent for associateship; and 1.0 percent for not employed.

6. Figure 7 (page 27): See technical note 4 for the overall nonresponse rate to the debt question in 1989. By broad field of doctorate, the rates of nonresponse were 9.0 percent in physical sciences; 10.1 percent in engineering; 8.2 percent in life sciences; 13.5 percent in social sciences; 9.7 percent in humanities; 8.5 percent in education; and 10.4 percent in professional/other fields.

POSTGRADUATION PLANS

In 1989, 65.8 percent of Ph.D.s reported "definite" commitments for either employment or study after graduation; 8.0 percent reported that they were in the process of "negotiating" with one or more organizations; 15.0 percent reported that they were "seeking" positions with no prospects as of yet; and 11.2 percent did not respond to the question. Because doctorate recipients sometimes complete the survey questionnaire months ahead of their actual graduation, it is not possible to determine the final postgraduation plans of many recipients. It is quite likely, however, that some of those Ph.D.s who indicated "negotiating" or "seeking" found positions by the time of graduation. Because the final outcomes are unknown, data on postgraduation plans in this report are restricted to the group of Ph.D.s with known "definite" plans: 71.4 percent of all Ph.D.s in 1973, 68.5 percent in 1979, and 65.8 percent in 1989. Comparisons with recent data from the longitudinal Survey of Doctorate Recipients (SDR) have shown the data on "definite" postgraduation plans to be a reasonable predictor of the actual employment status of new Ph.D.s in the year following the doctorate. (The SDR, also conducted by the National Research Council, is a follow-up employment survey of a sample of doctorate recipients in science, engineering, and humanities fields.) According to the 1989 SDR, 97.2 percent of the 1987-1988 Ph.D.s who had indicated "definite" employment plans in the United States at the time of graduation were in the U.S. labor force as of February 1989. Even among non-U.S. citizens, the percentages of new Ph.D.s in the U.S. labor force a year after graduation were quite high (98.5 percent of permanent residents and 94.8 percent of temporary residents). In addition, 94.4 percent of all graduates with immediate postgraduation plans in academe and 90.7 percent of those with plans in industry were working in the same sectors one year later.

7. Table 8 (page 19): The proportions of Ph.D.s reporting "definite" plans in 1989 were as follows: 65.8 percent of all Ph.D.s; 65.9 percent of men; 65.7 percent of women; 75.2 percent of U.S. citizens; 58.4 percent of permanent residents; 63.7 percent of temporary residents; 74.1 percent of U.S. citizens and permanent residents as an aggregate (within this group, 71.0 percent of American Indians, 63.8 percent of Asians, 67.4 percent of blacks, 71.0 percent of Hispanics, and 75.3 percent of whites); 68.6 percent of all Ph.D.s in physical sciences; 58.7 percent in engineering; 70.9 percent in life sciences; 61.0 percent in humanities; 68.3 percent in education; and 71.0 percent in professional/other fields. Virtually all of the Ph.D.s who reported "definite" commitments also indicated their plans for employment versus study; the only groups with a nonresponse rate of more than one percent to this question were American Indians and blacks (among U.S. citizens and permanent residents) and humanities Ph.D.s. For the percentages of Ph.D.s in 1973 and 1979 who reported "definite" plans, see the introductory paragraph on postgraduation plans.

8. Table 9 (page 21): See technical note 7 for percentages of U.S. citizens and permanent residents (as an aggregate) with "definite" plans. Of this group in 1989, 75.2 percent planned to be employed in the United States. The proportions were 82.5 percent in 1973 and 79.0 percent in 1979. Among the employed, no more than one percent in each year did not report their employment sector.

9. Table 10 (page 23): See technical note 8 for percentages of U.S. citizen and permanent resident Ph.D.s with employment commitments in the United States. Among those who planned to work in the United States, the nonresponse rates to the question on primary work activity were 4.6 percent in 1973, 7.2 percent in 1979, and 5.7 percent in 1989. See also technical note 7.

10. Figure 10 (page 46): In 1989, 58.4 percent of permanent residents reported "definite" postgraduation plans; 11.3 percent said they were "negotiating"; 24.6 percent said they were "seeking"; and 5.7 percent did not respond to the question. The "definite" percentage for permanent residents was 56.7 percent in 1973 and 62.2 percent in 1979. Among temporary residents in 1989, 63.6 percent reported "definite"; 11.5 percent "negotiating"; 19.1 percent "seeking"; and 5.8 percent did not respond to the question. The "definite" percentage for temporary residents was 66.6 percent in 1973 and 67.5 percent in 1979. Among permanent residents with definite plans, the rates of nonresponse to the question on postdoctoral location were 4.4 percent in 1973, 6.5 percent in 1979, and 9.9 percent in 1989. Among temporary residents, the nonresponse rates were 2.6 percent in 1973, 5.3 percent in 1979, and 9.9 percent in 1989.

11. Table 20 (page 48): See technical note 10 for percentages of permanent and temporary residents with definite postgraduation plans. Of those Ph.D.s who indicated definite commitments, the percentages of permanent residents not reporting both their intended postdoctoral location and their employment/study plans were 5.4 percent in 1973, 7.6 percent in 1979, and 10.4 percent in 1989. Among temporary residents, the percentages were 3.2 percent in 1973, 7.1 percent in 1979, and 10.5 percent in 1989.

12. Figure 11 (page 50) and Table 21 (page 52): In 1973, 60 percent of permanent residents with definite commitments planned to work in the United States; this percentage was 71 percent in 1979 and 61 percent in 1989. Among temporary residents with definite commitments, the percentages with employment plans in the United States were 16 percent in 1973, 21 percent in 1979, and 27 percent in 1989. Virtually all of these Ph.D.s reported employment sector; the highest nonresponse rate was 0.4 percent for permanent residents in 1979. See also technical notes 10 and 11.

13. Table 22 (page 55): See technical note 12 for percentages of permanent and temporary resident Ph.D.s with employment commitments in the United States. Among permanent residents who planned to work in the United States, the nonresponse rates to the question on primary work activity were 6.5 percent in 1973, 10.2 percent in 1979, and 7.5 percent in 1989. Among temporary residents, the nonresponse rates were 3.8 percent in 1973, 9.4 percent in 1979, and 7.4 percent in 1989. See also technical notes 10 and 11.

PRIMARY SOURCE OF SUPPORT

14. Table 11 (page 26) and Table 19 (page 45): In 1989, 18.2 percent of all Ph.D.s did not indicate a primary source of support. The nonresponse rates were 18.3 percent for men; 17.9 percent for women; 9.5 percent for U.S. citizens; 14.9 percent for permanent residents; and 13.7 percent for temporary residents. Among U.S. racial/ethnic groups, the rates of nonresponse were 10.8 percent for American Indians; 11.1 percent for Asians; 15.0 percent for blacks; 12.7 percent for Hispanics; and 8.8 percent for whites.

By broad field of doctorate, the nonresponse rates in 1989 were 19.1 percent in physical sciences; 18.8 percent in engineering; 15.7 percent in life sciences; 21.2 percent in social sciences; 19.7 percent in humanities; 15.9 percent in education; and 17.6 percent in professional/other fields.

RACE/ETHNICITY

15. Figure 5 (page 11) and Table 4 (page 13): In 1989, 1.7 percent of U.S. citizen Ph.D.s did not report race/ethnicity.

TIME-TO-DEGREE

16. Figure 6 (page 15) and Table 6 (page 17): Total elapsed time from baccalaureate to doctorate (TTD) can only be computed for individuals whose baccalaureate year is known (BA year is often obtained from commencement programs or doctorate institutions if recipients do not provide it). TTD could not be computed for 0.8 percent of Ph.D.s in 1960, 1.8 percent in 1973, and 9.0 percent in 1989. Registered time (RTD) is the time actually enrolled between the baccalaureate and the doctorate; RTD cannot be computed for individuals who have not provided all years during which they were enrolled in school after earning the baccalaureate. RTD was not available for 5.1 percent of Ph.D.s in 1960, 8.2 percent in 1973, and 17.0 percent in 1989. See technical note 17 for 1989 nonresponse rates by field and demographic group.

17. Table 7 (page 18): See technical note 16 for a description of total and registered time-to-degree and for the overall nonresponse rates for 1989. By broad field in 1989, the rates of nonresponse were 8.7 percent (TTD) and 16.3 percent (RTD) in physical sciences; 10.0 percent (TTD) and 16.4 percent (RTD) in engineering; 7.7 percent (TTD) and 16.2 percent (RTD) in life sciences; 12.1 percent (TTD) and 19.9 percent (RTD) in social sciences; 8.1 percent (TTD) and 17.1 percent (RTD) in humanities; 7.5 percent (TTD) and 15.8 percent (RTD) in education; 8.2 percent (TTD) and 17.5 percent (RTD) in professional/other fields. By demographic group, the nonresponse rates for these time-to-degree measures were 9.5 percent (TTD) and 17.6 percent (RTD) for men; 8.0 percent (TTD) and 15.9 percent (RTD) for women; 1.6 percent (TTD) and 7.4 percent (RTD) for U.S. citizens; 7.7 percent (TTD) and 14.7 percent (RTD) for permanent residents; 7.2 percent (TTD) and 15.0 percent (RTD) for temporary residents. Among U.S. racial/ethnic groups, the nonresponse rates were 3.2 percent (TTD) and 10.8 percent (RTD) for American Indians; 2.6 percent (TTD) and 9.0 percent (RTD) for Asians; 2.7 percent (TTD) and 10.2 percent (RTD) for blacks; 3.0 percent (TTD) and 10.4 percent (RTD) for Hispanics; 1.4 percent (TTD) and 7.0 percent (RTD) for whites.

APPENDIX D

SURVEY OF EARNED DOCTORATES 1987-88 ,1988-89

Form Approved
OMB No. 3145-0019
Approval Expires 3/89

This form is to be returned to the GRADUATE DEAN, for forwarding to .....

The Office of Scientific and Engineering Personnel
National Research Council
2101 Constitution Avenue, Washington, D.C. 20418

Please print or type.

1. Name in full: _____
   Last Name *First Name* *Middle Name*

   Cross Reference. Maiden name or former name legally changed _____

2. Permanent address through which you could always be reached: (Care of, if applicable) _____

   _____
   Number *Street* *City*

   _____
   State *Zip Code* *Or Country if not U.S.*

3. U.S. Social Security Number: _ _ _ - _ _ - _ _ _ _

4. Date of birth: _____ Place of birth: _____
   Month Day Year *State Or Country if not U.S.*

5. Sex: 1 ☐ Male 2 ☐ Female

6. Marital status: 1 ☐ Married
   2 ☐ Not married (including widowed, divorced)

7. Citizenship:
   0 ☐ U.S. native
   1 ☐ U.S. naturalized
   2 ☐ Non-U.S., Immigrant (Permanent Resident)
   _____ *(country of present citizenship)*
   3 ☐ Non-U.S., Non-Immigrant (Temporary Resident)
   _____ *(country of present citizenship)*

8. Are you physically handicapped? ☐ Yes ☐ No
   If yes, is it: 1 ☐ Visual 2 ☐ Orthopedic
   3 ☐ Auditory 4 ☐ Vocal
   5 ☐ Other (Specify) _____

9. What is your racial background? (Check only one)
   0 ☐ American Indian or Alaskan Native
   1 ☐ Asian or Pacific Islander
   2 ☐ Black
   3 ☐ White

10a. Is your ethnic heritage Hispanic? ☐ Yes ☐ No

10b. If yes, is it: 0 ☐ Mexican American
   1 ☐ Puerto Rican
   2 ☐ Other Hispanic

11. Number of dependents: _____ Do not include yourself. (Dependent = someone receiving at least one half of his or her support from you)

EDUCATION

12. Location of high school last attended: _____ Year of graduation from high school: _____
    State Or Country if not U.S.

13. List in the table below all collegiate and graduate institutions you have attended including 2-year colleges and each degree earned. List chronologically, and include your doctoral institution as the last entry.

Institution Name / Location	Years Attended		Major Field		Degree (if any)		
			Use Specialties List		Title of Degree	Granted	
	From	To	Name	Number		Mo.	Yr.

14. In the spaces below, categorize the period of years between receiving your first baccalaureate degree (or equivalent) and receiving your doctorate, including the period spent on your thesis and/or dissertation. If necessary, round years so that your total will equal Year of Doctorate minus Year of Baccalaureate.
    1 Number of years as full-time student _____
    2 Number of years as part-time student _____
    3 Number of years not working on degree + _____
    Total = Year of Doctorate minus Year of BA. = _____

15. Enter below the title of your doctoral dissertation and the most appropriate classification number and field. If a project report or a musical or literary composition (not a dissertation) is a degree requirement, please check box. ☐

    Title _____ Classify field using Specialties List

    _____ Number Name of field

    _____ _____ _____

16. Name the department (or interdisciplinary committee, center, institute, etc.) and school or college of the university which supervised your doctoral program: _____
    Department Institute Committee Program *School*

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continued on next page

17. Name of your adviser for dissertation, project report, or music literary composition: _____
Last Name First Name Middle Initial

18. What is your best estimate of the percentage of support received from the following sources during the course of your graduate study? (Total should equal 100%)

	%		%		%
Own Family Resources		Research Assistant		p ___ Other Dept of Ed	Student Loans
a ___ Own Earnings		i ___ NSF		q ___ Veterans Administration (G I Bill, etc.)	v ___ Guaranteed Student Loan
b ___ Spouse's Earnings		j ___ NIH		4 ___ USDA Fellowship	w ___ National Direct Student Loan
c ___ Family Contributions		2 ___ USDA		r ___ Other Federal _____ Specify	x ___ Other Loan _____ Specify
University-Related		k ___ Other Federal			
d ___ Teaching Assistantship		Other Federal Support		U S Nationally Competitive Fellowships (Non-Federal)	Other Sources
e ___ Research Assistantship		3 ___ NSF Fellowship		s ___ Ford Foundation	y ___ Business Employer Funds
i ___ University Fellowship		l ___ NIH Traineeship		t ___ Rockefeller Foundation	z ___ Foreign (Non-U S) Govt
g ___ College Work-Study		m ___ Other HHS		u ___ Other Fellowship _____ Specify	5 ___ Other _____ Specify
h ___ Other _____ Specify		n ___ Title VI Foreign Language & Area Studies Fellowship			
		o ___ Graduate & Professional Opportunities Program Fellowship (G*POP)			

19. When you receive your doctorate degree, will you have any debt directly related to your undergraduate and or graduate education (tuition and fees, living expenses, books and supplies, transportation to and from school)?
Yes No
If yes, what will be the level of this cumulative debt?
1 $5,000 or less
2 $5,001–$10,000
3 $10,001–$20,000
4 $20,001–$30,000
5 $30,001 or more

20a. Please check the category which most fully describes your status during the year immediately preceding the award of the doctorate
0 Full-time employed (Go to item 20b)
1 Held fellowship
2 Held assistantship
3 Part-time employed
4 Not employed
5 Other (specify) _____

20b. If full-time employed, what type of position did you hold?
6 College or university, faculty
7 College or university, non-faculty
8 Elem. or sec. school, teaching
9 Elem. or sec. school, non-teaching
(11) Industry or business
(12) Other (specify) _____

POSTGRADUATION PLANS

21. What is the status of your current postgraduate plans?
0 Am returning to, or continuing in, predoctoral employment
1 Have signed contract or made definite commitment
2 Am negotiating with one or more specific organizations
3 Am seeking position but have no specific prospects
4 Other (specify) _____

22. What best describes your immediate postgraduate plans?
0 Postdoctoral fellowship
1 Postdoctoral research associateship
2 Traineeship
3 Other study (specify) _____
(Go to item 23)
4 Employment (other than 0,1,2,3)
5 Military service
6 Other (specify) _____
(Go to item 24)

23. If you plan to have a postdoctoral fellowship, associateship, traineeship, or otherwise undertake further study:
A What will be the field of your postdoctoral study? Please enter number from Specialties List _____
B What will be the primary source of research support?
0 U S Government
1 College or university
2 Private foundation
3 Nonprofit, other than private foundation
4 Other (specify) _____
6 Unknown
Go to Item 25

24. If you plan to be employed, enter military service, or other:
A What will be the type of employer?
a U S 4-year college or university other than medical school
b Foreign university
c Medical school
d Jr. or community college
e Elem. or sec. school
f Foreign government
g U S Federal government
h U S state government
i U S local government
j Nonprofit organization
k Industry or business
l Self-employed
m Other (specify) _____
B Indicate what your **primary** work activity will be with 1 in appropriate box; **secondary** work activity (if any) with 2 in appropriate box.
0 Research and development
1 Teaching
2 Administration
3 Professional services to individuals
5 Other (specify) _____
C In what field will be your working? Please enter number from Specialties List _____

25. What is the name and address of the organization with which you will be associated?
_____
Name of Organization
_____
Street City, State Or Country if not U S

BACKGROUND INFORMATION

26. Please indicate, by circling the highest grade attained, the education of

		Elementary School				High School				College				Graduate		
your father:	none	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	MA, MD	PhD	Postdoctoral
your mother:	none	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	MA, MD	PhD	Postdoctoral
	0	1		2		3				4		5		6		7		8	9	(11)

Signature _____ Date _____

If you would like to receive a summary of the results of this survey, please check box. ☐

SPECIALTIES LIST

Instructions: The following field listing is to be used in responding to items 13, 15, 23A, and 24C. If a field marked with an asterisk (*) is chosen in item 13 or 15, please write in your field of specialization in the space provided.

AGRICULTURE

000 Agricultural Economics
002 Agricultural Business & Mgmt.
005 Animal Breeding & Genetics
010 Animal Nutrition
012 Dairy Science
014 Poultry Science
055 Fisheries Sciences
019 Animal Sciences, Other*
020 Agronomy
025 Plant Breeding & Genetics
030 Plant Path. (See also 120)
032 Plant Protection-Pest Mgmt.
039 Plant Sciences, Other*
042 Food Distribution
043 Food Engineering
044 Food Sciences, Other*
046 Soil Chemistry Microbiology
049 Soil Sciences, Other*
050 Horticulture Science
066 Forest Biology
068 Forest Engineering
070 Forest Management
072 Wood Science
074 Renewable Natural Resources
079 Forestry & Related Sci., Other*
080 Wildlife Range Management
098 Agriculture, General
099 Agricultural Sciences, Other*

BIOLOGICAL SCIENCES

100 Biochemistry
105 Biophysics
110 Bacteriology
115 Plant Genetics
120 Plant Path. (See also 030)
125 Plant Physiology
129 Botany, Other*
130 Anatomy
133 Biometrics & Biostatistics
136 Cell Biology
139 Ecology
142 Embryology
145 Endocrinology
148 Entomology
151 Immunology
154 Molecular Biology
157 Microbiology
160 Neurosciences
163 Nutritional Sciences
166 Parasitology
169 Toxicology
170 Genetics, Human & Animal
175 Pathology, Human & Animal
180 Pharmacology, Hum. & Anim.
185 Physiology, Human & Animal
189 Zoology, Other*
198 Biological Sciences, General
199 Biological Sciences, Other*

HEALTH SCIENCES

200 Audiology & Speech Pathology
210 Environmental Health
215 Public Health
220 Epidemiology
230 Nursing
240 Pharmacy
250 Veterinary Medicine
298 Health Sciences, General
299 Health Sciences, Other*

ENGINEERING

300 Aerospace, Aeronautical & Astronautical
303 Agricultural
306 Bioengineering & Biomedical
309 Ceramic
312 Chemical
315 Civil
318 Communications
321 Computer
324 Electrical, Electronics
327 Engineering Mechanics
330 Engineering Physics
333 Engineering Science
336 Environmental Health Engin.
339 Industrial
342 Materials Science
345 Mechanical
348 Metallurgical
351 Mining & Mineral
354 Naval Arch. & Marine Engin.
357 Nuclear
360 Ocean
363 Operations Research (See also 465, 930)
366 Petroleum
369 Polymer
372 Systems
398 Engineering, General
399 Engineering, Other*

COMPUTER AND INFORMATION SCIENCES

400 Computer Sciences*
410 Information Sci. & Systems*

MATHEMATICS

420 Applied Mathematics
425 Algebra
430 Analysis & Functional Analysis
435 Geometry
440 Logic (See also 785)
445 Number Theory
450 Probability & Math. Statistics (See also 690)
455 Topology
460 Computing Theory & Practice
465 Operations Research (See also 363, 930)
498 Mathematics, General
499 Mathematics, Other*

PHYSICAL SCIENCES

Astronomy

500 Astronomy
505 Astrophysics

Atmospheric & Meteorological Sciences

510 Atmospheric Physics & Chem.
512 Atmospheric Dynamics
514 Meteorology
518 Atmos. & Meteor. Sci., Gen.
519 Atmos. & Meteor. Sci., Other*

Chemistry

520 Analytical
522 Inorganic
524 Nuclear
526 Organic
528 Pharmaceutical
530 Physical
532 Polymer
534 Theoretical
538 Chemistry, General
539 Chemistry, Other*

Geological Sciences

540 Geology
542 Geochemistry
544 Geophysics & Seismology
546 Paleontology
548 Mineralogy, Petrology
550 Stratigraphy, Sedimentation
552 Geomorphology & Glacial Geol.
554 Applied Geology
558 Geological Sciences, General
559 Geological Sciences, Other*

Physics

560 Acoustics
561 Atomic & Molecular
562 Electron
564 Elementary Particle
566 Fluids
568 Nuclear
569 Optics
570 Plasma
572 Polymer
574 Solid State
578 Physics, General
579 Physics, Other*

Other Physical Sciences

580 Environmental Sciences
585 Hydrology & Water Resources
590 Oceanography
595 Marine Sciences
599 Physical Sciences, Other*

PSYCHOLOGY

600 Clinical
603 Cognitive
606 Comparative
609 Counseling
612 Developmental
615 Experimental
618 Educational (See also 822)
621 Industrial & Organizational (See also 935)
624 Personality
627 Physiological
630 Psychometrics
633 Quantitative
636 School (See also 825)
639 Social
648 Psychology, General
649 Psychology, Other*

SOCIAL SCIENCES

650 Anthropology
652 Area Studies
658 Criminology
662 Demography
666 Economics
668 Econometrics
670 Geography
674 International Relations
678 Political Sci. & Government
682 Public Policy Studies
686 Sociology
690 Statistics (See also 450)
694 Urban Studies
698 Social Sciences, General
699 Social Sciences, Other*

HUMANITIES

History

700 History, American
705 History, European
710 History of Science
718 History, General
719 History, Other*

Letters

720 Classics
723 Comparative Literature
729 Linguistics
732 Literature, American
733 Literature, English
734 English Language
736 Speech & Debate
738 Letters, General
739 Letters, Other*

Foreign Languages and Literature

740 French
743 German
746 Italian
749 Spanish
752 Russian
755 Slavic (other than Russian)
758 Chinese
762 Japanese
765 Hebrew
768 Arabic
769 Other Languages*

Other Humanities

770 American Studies
773 Archeology
776 Art History & Criticism
780 Music
785 Philosophy (See also 440)
790 Religion (See also 984)
795 Theatre
798 Humanities, General
799 Humanities, Other*

EDUCATION

800 Curriculum & Instruction
805 Educ. Administration & Supervision
810 Educational Media
815 Educ. Stat. & Research
820 Educ. Testing, Evaluation & Measurement
822 Educational Psychology (See also 618)
825 School Psychology (See also 636)
830 Social Foundations
835 Special Education
840 Student Counseling & Personnel Services
845 Higher Education Research

Teacher Education

850 Pre-elementary
852 Elementary
856 Secondary
858 Adult & Continuing

Teaching Fields

860 Agricultural Educ.
861 Art Educ.
862 Business Educ.
864 English Educ.
866 Foreign Languages Educ.
868 Health Educ.
870 Home Economics Educ.
872 Industrial Arts Educ.
874 Mathematics Educ.
876 Music Educ.
878 Nursing Educ.
880 Physical Educ.
882 Reading Educ.
884 Science Educ.
885 Social Science Educ.
886 Speech Educ.
887 Technical Educ.
888 Trade & Industrial Educ.
889 Teacher & Educ. Specific Subject Areas, Other*
898 Education, General
899 Education, Other*

PROFESSIONAL FIELDS

Business & Management

900 Accounting
905 Banking & Finance
910 Business Admin. & Management
915 Business Economics
920 Marketing Mgmt. & Research
925 Business Statistics
930 Operations Research (See also 363, 465)
935 Organiz. Beh. (See also 621)
938 Business & Mgmt., General
939 Business & Mgmt., Other*

Communications

940 Communications Research
945 Journalism
950 Radio & Television
958 Communications, General
959 Communications, Other*

Other Professional Fields

960 Architec. & Environ. Design
964 Home Economics
968 Law
972 Library & Archival Science
976 Public Administration
980 Social Work
984 Theology (See also 790)
988 Professional Fields, General
989 Professional Fields, Other*

999 OTHER FIELDS*

The Appendix tables present data according to the following field classifications. Appendix A, Tables 1 and 2 and Appendix B, Table 1 display all subfields that are on the survey Specialties List. Appendix A, Tables 4, 5, and 6 show data by seven broad fields only. Appendix A, Tables 3 and 7 include the additional field groupings indicated below.

SCIENCES

Physical Sciences (400-599)
- Physics and Astronomy (500-505, 560-579)
- Chemistry (520-539)
- Earth, Atmospheric and Marine Sciences (510-519, 540-559, 580-599)
- Mathematics (420-499)
- Computer Sciences (400-410)

} Combined in Table 7

Engineering (300-399)

Life Sciences (000-299)
- Biological Sciences (100-199)
  - Biochemistry (100)
  - Other Biological Sciences (105-199)
- Health Sciences (200-299)
- Agricultural Sciences (000-099)

Social Sciences (600-699)
- Psychology (600-649)
- Economics and Econometrics (666, 668)
- Anthropology and Sociology (650, 686)
- Political Science and International Relations (674, 678)
- Other Social Sciences (652-662, 670, 682, 690-699)

} Combined in Table 7

NONSCIENCES

Humanities (700-799)
- History (700-719)
- English and American Language and Literature (732-734)
- Foreign Languages and Literature (740-769)
- Other Humanities (720-729, 736-739, 770-799)

} Combined in Table 7

Education (800-899)

Professional and Other Fields (900-999)
- Business and Management (900-939)
- Other Professional Fields (940-989)
- Other Fields (999)

NOTE: Doctorate recipients indicate their fields of speciality. Their choices may differ from departmental names.

TITLES OF RESEARCH DEGREES INCLUDED IN THE SURVEY OF EARNED DOCTORATES

DA	Doctor of Arts	DMSc	Doctor of Medical Science
DArch	Doctor of Architecture	DNSc	Doctor of Nursing Science
DAS	Doctor of Applied Science	DPA	Doctor of Public Administration
DBA	Doctor of Business Administration	DPE	Doctor of Physical Education
DChem	Doctor of Chemistry	DPH	Doctor of Public Health
DCJ	Doctor of Criminal Justice	DPS	Doctor of Professional Studies
DCL	Doctor of Comparative Law/Civil Law	DrDES	Doctor of Design
DCrim	Doctor of Criminology	DRE	Doctor of Religious Education
DED	Doctor of Environmental Design	DRec/DR	Doctor of Recreation
DEng	Doctor of Engineering	DSc/ScD	Doctor of Science
DEnv	Doctor of Environment	DScD	Doctor of Science in Dentistry
DESc/ScDE	Doctor of Engineering Science	DScH	Doctor of Science and Hygiene
DF	Doctor of Forestry	DScVM	Doctor of Science in Veterinary Medicine
DFA	Doctor of Fine Arts		
DGS	Doctor of Geological Science	DSM	Doctor of Sacred Music
DHL	Doctor of Hebrew Literature/Letters	DSSc	Doctor of Social Science
DHS	Doctor of Health and Safety	DSW	Doctor of Social Work
DHS	Doctor of Hebrew Studies	EdD	Doctor of Education
DIT	Doctor of Industrial Technology	JCD	Doctor of Canon Law
DLS	Doctor of Library Science	JSD	Doctor of Juristic Science
DM	Doctor of Music	LScD	Doctor of Science of Law
DMA	Doctor of Musical Arts	PhD	Doctor of Philosophy
DME	Doctor of Music Education	RhD	Doctor of Rehabilitation
DMin/DM	Doctor of Ministry	SJD	Doctor of Juridical Science
DML	Doctor of Modern Languages	STD	Doctor of Sacred Theology
DMM	Doctor of Music Ministry	ThD	Doctor of Theology